American Forestry

Vol. 22 SEPTEMBER 1916 No. 273

THE SHORTLEAF YELLOW PINE

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AMERICAN FORESTRY

The Magazine of the American Forestry Association

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AMERICAN FORESTRY

VOL. XXII SEPTEMBER 1916 No. 273

Shortleaf Pine

Identification and Characteristics

BY SAMUEL B. DETWILER

THE pine forests of the southern United States long have furnished more lumber under the name of Southern Yellow Pine than any other closely related group of timber trees in this country. Shortleaf pine (*Pinus echinata*) produces more than one-fifth of the lumber derived from the five southern "Yellow Pines" and promises to be even more prominent in the future when systematic forest management in the United States is more fully developed.

Shortleaf pine is found in a territory covering more than 440,000 square miles and is commercially important in an area of about two-thirds this size. Its region of natural growth extends from southeastern New York through the southern limits of Pennsylvania, Ohio, Indiana, Illinois, Missouri, and southward to eastern Texas and northern Florida. No other American pine is so widely distributed. It makes its best growth at elevations of 400 to 1500 feet, but extends from sea level to an altitude of 3000 feet in the Southern Appalachian Mountains.

Shortleaf pine grows to moderate proportions for a member of the pine family, rarely attaining 4 feet in diameter and 130 feet in height. The ordinary size of mature trees is 2 or 3 feet across the stump, with a total height of 80 to 100 feet. Because this species can grow rapidly in height when young trees are crowded together in dense forests, trees in the woods have long, clean, straight trunks that taper slightly until they branch into small, rounded or somewhat pointed tops. The exceptionally clear, straight trunks furnish the quality of logs most desired by lumbermen. Trees growing in the open have branches low on the trunk, forming a conical crown. The lower branches droop slightly and are seldom more than 20 or 25 feet long. The straight, gently tapering trunk and narrow, compact, well-proportioned head enable the trained eye to distinguish from a distance the shortleaf pine from the broader topped loblolly and longleaf pines.

TYPICAL STAND OF SHORTLEAF PINE

This photograph, published by courtesy of the Southern Soft Pine Bureau, shows a first-class stand of shortleaf, the size of the trees being indicated by comparison with the man standing by one on the right.

Recent scientific studies have shown that up to fifteen years of age the tops of shortleaf pines in dense stands have an outward growth of one foot for each inch in diameter growth of the trunk at breast height. In later life the increase in the spread of the

branches varies from 17 to 21 inches for each inch of diameter, according to the region in which the trees grow. Knowledge of this law of growth is used by the forester in determining the number of trees per acre required to produce the highest profits in a well-managed forest.

The light brown bark of old trees is rather thick and is broken into squarish plates which are covered with thin, cinnamon-red scales that peel off easily. Young twigs have smooth, violet-colored bark; twigs of shortleaf pine differ from those of other pines with which it grows in being brittle and easily snapped off. Until maturity, loblolly pines have somewhat thicker and darker colored bark than the shortleaf, and the furrows are deeper.

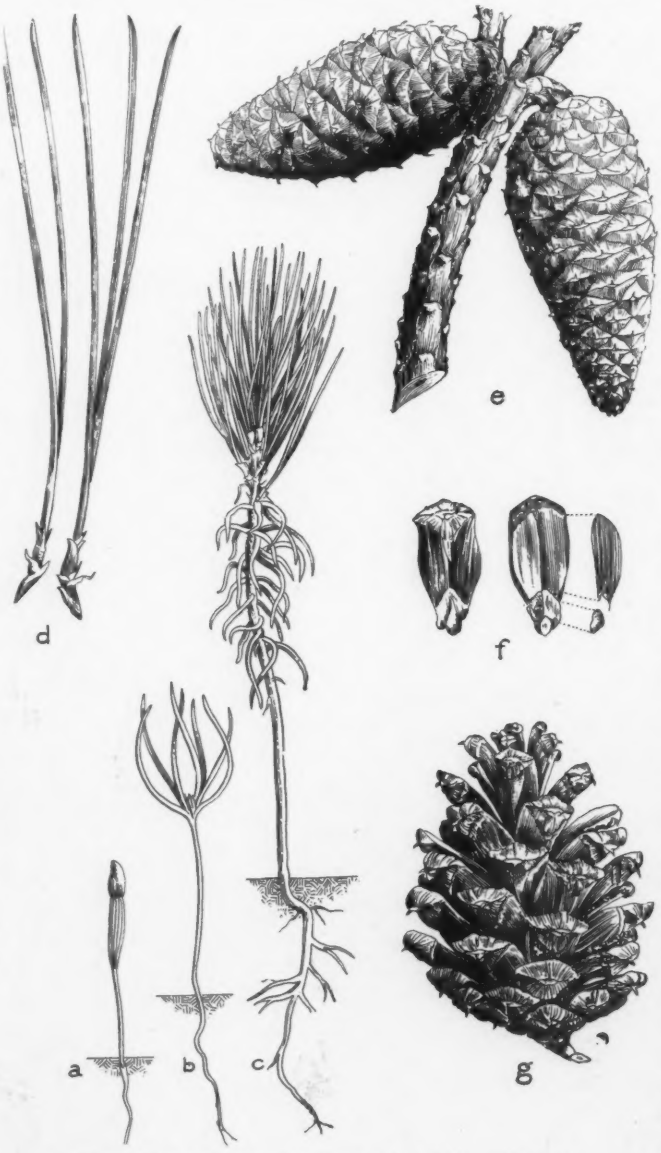
A large number of misleading local names embarrasses the shortleaf pine. In fifteen states, from New York to Louisiana, it is often called Yellow pine. In some of these states it is called Spruce pine, Bull pine, Pitch pine, Poor pine, Rosemary pine, Slash pine or Old Field pine. Another name that is much used, especially for the lumber, is North Carolina pine, or North Carolina Yellow pine.

Shortleaf pine, the name that fits it best and is most used, is derived from its short, slender leaves. The soft, flexible needles are 3 to 5 inches long and are short only in comparison with those of the longleaf pine, which are three times this length. As a rule two needles are found enclosed at the base by a short persistent sheath but occasionally there may be three, or rarely even four leaves in a bundle. The foliage varies in color, according to locality, from deep blue-green to pale green.

The flower buds appear on shortleaf pine during the latter part of the winter, opening in March in the far South, and in April or May in its northern limits. Dense clusters of pollen-producing flowers, about an inch long, are borne at the tips of the twigs. Each flower is a pale purple cylinder of numerous overlapping pollen sacs and surrounded at the base with 8 or 9 small scales. These flowers drop from the tree as soon as the pollen has been discharged. One to four cone-forming flowers are produced just below the tips of the young shoots. They are oblong bodies about one-fourth of an inch in length composed of numerous overlapping pointed scales of a delicate rose-pink color. The cones develop slowly, the seed ripening only after two seasons' growth.

The mature cones are attached very close to the branch and have a leathery brown color. They are 1½ to 2½ inches long and nearly as wide when open. Each scale has a thickened four-angled tip which is smooth, or armed with a weak, curved prickle. The cone opens early in the autumn to discharge the small triangular seeds which are all shed by December, although the old cones may continue to hang on the branches two or three years longer. A relatively large wing about half an inch in length is attached to one end of the seed and enables a strong wind to carry the seed from one-eighth to one-fourth of a mile. A light breeze will waft the seeds a distance equal to two to five times the height of the mother tree. A pound of clean seed contains from 50,000 to 70,000 separate seeds and ordinarily germinates sufficiently well to produce from 25,000 to 40,000 seedlings. The seed retains its vitality well for several years when properly stored.

Shortleaf pine has a pronounced tap root and strong side roots; for this reason the trees are not easily thrown by the wind. The long tap root enables it to grow thriftily in soils not well supplied with moisture, such as dry sands or high ridges. One instance is noted in which an eight-year-old short-



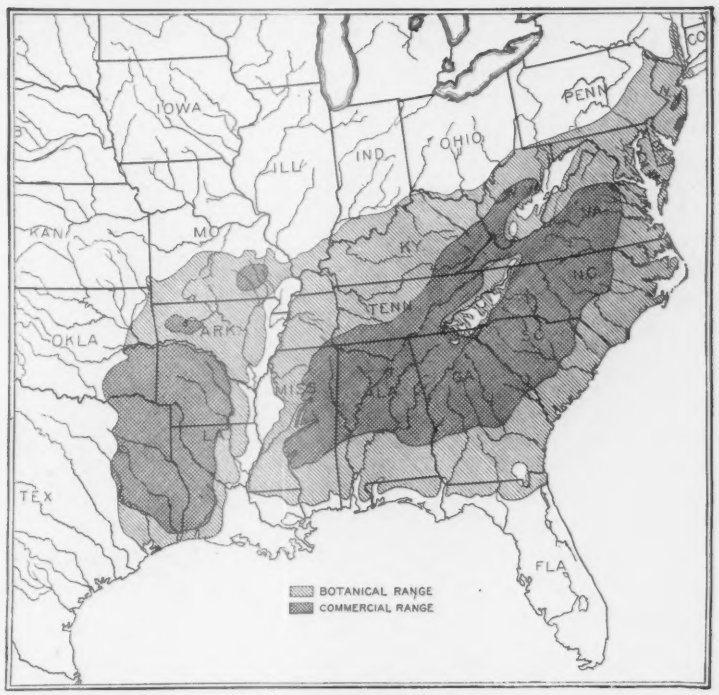
SHORTLEAF PINE LEAVES, SEED, CONE AND SEEDLING

a—Young seedling.
b—Same seedling after one month's growth.
c—Same seedling at end of first season showing early bundles of true leaves.
d—Two-leaf and three-leaf clusters.
e—Branch with mature closed cones or burrs.
f—Cone scale and seed with wing detached.
g—Mature cone opened.

leaf sapling had a tap root reaching to a depth of 14 feet. Only a very few coniferous trees have the power to send up vigorous shoots from their stumps when the trees have been felled or the tops have been killed by fire, but shortleaf pine possesses this valuable means of reproducing itself during the early years of its life.

A cross-section of a log of shortleaf pine shows a broad band of nearly white sapwood surrounding the pale, reddish brown or orange-colored heartwood. The wood is straight-grained and varies considerably in resin content and hardness, but is stiff, strong and moderately heavy. The well-defined rings of annual growth consist of a band of light-colored soft wood surrounded by a darker band of denser, harder and more resinous wood. These bands in the annual ring are known respectively as the spring wood and the summer wood.

Forests composed entirely of shortleaf pine are found, but stands of pure growth usually are of small extent, surrounded by areas of shortleaf mixed with other pines or hardwoods. Pitch pine and scrub pine share a considerable portion of its territory in the north, and loblolly pine grows practically throughout the range of shortleaf on the heavier and more moist soils. Longleaf pine and three other southern pines grow with it in the South, and in the Appalachian Mountains it meets white pine and table mountain pine. Many kinds of oaks and hickories are frequent companions of the shortleaf pine, together with less important broad-leaf trees such as persimmon, sassafras and dogwood.



RANGE OF SHORTLEAF PINE

The heavily shaded portion of the map shows the commercial range of this famous and much-used wood, while the lightly shaded portion indicates the botanical range.

BARK OF SHORTLEAF PINE

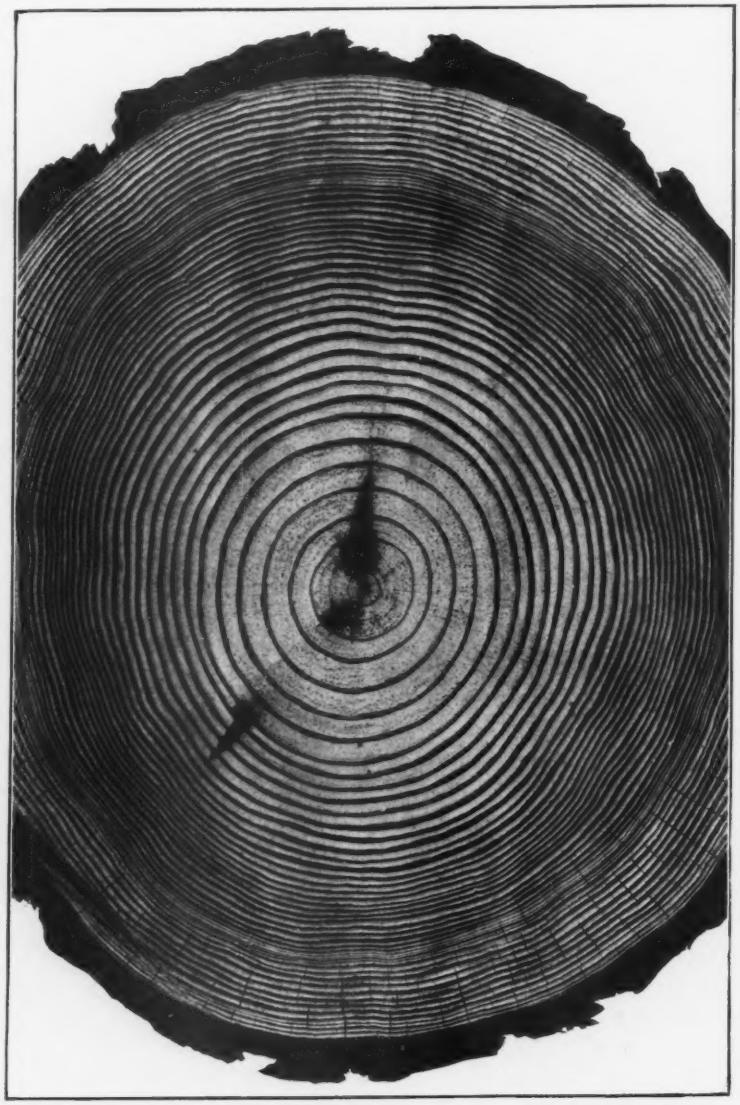
Shortleaf pine grows well on many kinds of soils, ranging from sand and gravel to stiff clays. Unlike loblolly pine, which prefers low-lying land, it always selects the better drained sites. The vigor of the tree is shown by the wide variations in temperature it can endure; it withstands temperatures of 22° F. below zero in New York and New Jersey, and grows equally well in Louisiana, where the thermometer may register 112°F.

Shortleaf grows more rapidly than longleaf pine and more slowly than loblolly pine. Studies made by the Forest Service in stands of fully stocked second-growth shortleaf pine in North Carolina indicate that this tree in 80 years under the best conditions will yield in excess of 40,000 board feet (Scribner rule) per acre. On medium soils the growth in the same period will approximate 33,000 feet, board measure, per acre, and on poor soil in 80 years the yield is only about 24,000 feet. In stands 20 years old the lumber production was found to vary from 5700 board feet per acre on good soils to 700 board feet on poor soils.

Shortleaf pine in the forest may live to be 400 years of age, but its average life is not more than 200 to 300 years. To produce a mature stand of saw timber from shortleaf pine requires 80 to 100 years, depending on the quality of the soil. For tie production or cordwood the maximum growth occurs between the ages of 60 and 80 years. With proper thinning the rate of growth is considerably hastened.

The first thinning in well-stocked shortleaf pine forests should be made when the trees are 20 or 30 years old. Under average conditions, about one-third of the trees should be cut out in this early thinning; older stands should be treated less severely. Small, weak trees, struggling hopelessly below the tops of the majority of trees,

are of no benefit, and if left they may feed a forest fire that will cause severe injuries to the better trees. In addition to the sickly trees, some of those with smaller crowns that have not quite reached the general level of the stand should be removed to give the adjoining trees room to spread their tops a little further in the sunlight. Occasionally there will be found a tree which is much taller and larger than surrounding trees and rapidly overtopping them; by cutting these greedy individuals the thinning is made to yield more valuable material and the conditions of growth for the remaining trees are equalized. If the young forest is dense, it may be necessary to remove half or even two-thirds of the average-sized trees in order to give the remainder sufficient space for profitable growth. Before healthy trees are marked for cutting, the defective, crooked, forked or knotty trees and those which show fungus fruiting bodies or insect work should be taken out. If soil and climatic conditions favor the pine, it should be given preference over broad-leaf trees. The object to be borne in mind in marking the trees for thinning is to leave those that are to continue growth as uniform in height and spacing as possible. In the absence of other trees over a larger space than two or more square rods, all classes of trees should be retained.



THE GROSS CHARACTER OF THE SHORTLEAF PINE IN CROSS-SECTION

Millions of shortleaf, longleaf and loblolly pine trees in the South have been killed in recent years by the southern pine beetle. The loss caused by this insect is estimated to be more than $10,000,000 for the past twenty-year period. A practical remedy is to convert the trunks of the infested trees into cordwood and use the wood for fuel before the beetles leave the bark, or to manufacture the logs into lumber or other products and immediately burn the slabs of bark. A moth attacks and deforms the tips of vigorous young saplings, sometimes causing considerable injury for several successive years in some localities.

This tree is not subject to serious fungus enemies except such as attack the tree through wounds made by forest fires. Forest fires probably cause much greater financial loss than any other enemy of shortleaf pine. Trees which are not killed outright are weakened and retarded in their growth. Young shortleaf pines are blessed with an ability to send forth vigorous sprouts up to the time they are 8 to 12 years of age, and for this reason they are able to recover from the effects of many fires which completely eliminate other kinds of young pines from the forest.

The principal value of shortleaf pine for planting lies in the establishment of commercial forest plantations. Its growth is so rapid and it adapts itself so well to the purposes of the forester that in years to come it is likely to be planted extensively. The seed may be sown directly, either broadcast or in seed spots, where the trees are to grow permanently. Direct planting of young trees gives more certain results and it is not a difficult matter to raise the seedlings in seed beds. For general planting they should be set out early in the spring, spaced 6 feet by 6 feet, when they are a year old and before the tap root is greatly developed. If the land is very weedy or soil conditions are unfavorable, two-year-old transplanted stock should be used. However, the present need in most instances is better care of existing native growth. Shortleaf pine produces seed abundantly from youth to old age. Trees growing in the open bear seed in 20 years. Cut-over lands or old fields near shortleaf pine seed trees are

SEVENTY-YEAR-OLD SHORTLEAF PINE STAND

This shows a scientifically thinned stand of shortleaf pine in New Jersey. All of the thinnings have been fully utilized and the stand is in a thriving condition.

quickly seeded, resulting in dense stands of young pines of approximately the same age and size. Frequently it is possible to encourage natural reforestation by leaving seed trees in lumbering operations and guarding against forest fires, thus securing fine young stands of shortleaf pine at less cost than by forest planting.

As an ornamental tree, shortleaf pine compares with the best of Yellow pines and merits greater consideration for this purpose than it has received up to the present time. Its dark green, soft, glossy leaves and narrow, compact, well-shaped crown give it marked beauty. The vigor and hardiness of its growth and its power to adapt itself to an unusually wide range of soil conditions are qualities that add greatly to its value for general planting.

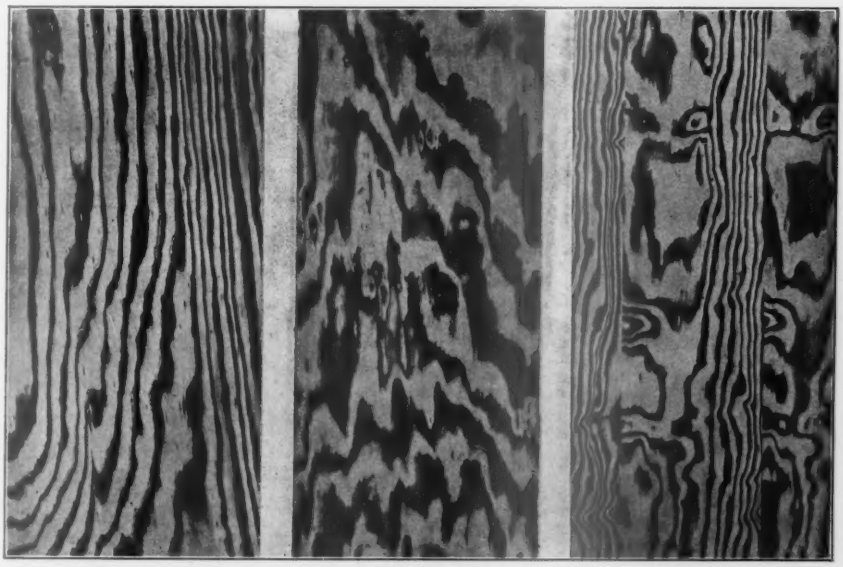
Commercial Uses of Shortleaf Pine

THE most useful wood that grows in America is southern yellow pine, the wood of a thousand uses. Not only is southern pine adapted to a greater variety of uses in building and manufacture than almost any other wood, but its by-products, aside from the most important purpose of making lumber, are remarkably varied in their nature and application. So intimately is yellow pine and its products associated with the daily life of humanity that very few persons conceive of the many ways in which it serves us. In city and country, day and night, whatever our occupation or condition in life, southern yellow pine is contributing something to our well being, literally "from the cradle to the grave."

Definitely restricted in the area of its growth, southern yellow pine's good qualities are so varied and its adaptability so superior that its distribution as lumber is limited only by the confines of civilization and the facilities for transportation.

In America its place in manufactures and building construction is such that more than 39 per cent of all the lumber consumed is southern yellow pine, while enormous quantities go to Europe. Its annual production—more than 14,000,000,000 board feet—is over three times as great as any other one wood and equal to the combined production of the five other leading woods.

Shortleaf pine (*Pinus echinata*) is one of the important southern yellow pines. For over two centuries it has held a prominent position commercially. The principal supply of shortleaf pine lumber comes from Alabama, Arkansas, Georgia, Louisiana, Mississippi, Missouri, North Carolina, South Carolina, eastern Oklahoma, eastern Texas and Virginia. It is found in a dozen other states but in relatively smaller quantities than in the states named.



VENEERED PANELS

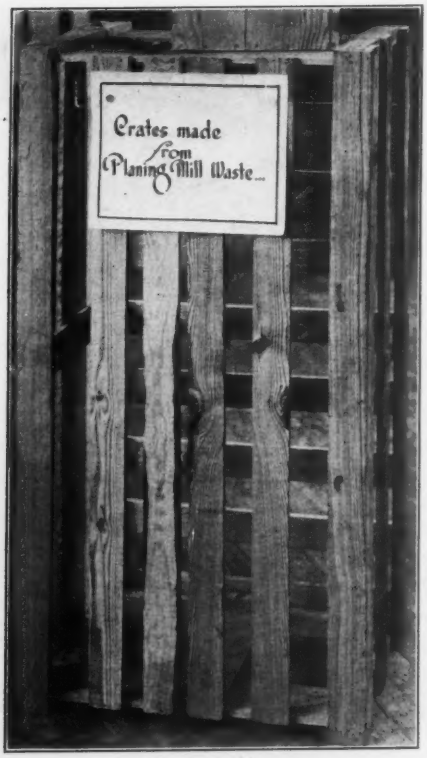
Giving a hint of the varied and beautiful grain of the wood of southern yellow pine now being so much used for interior trim of houses.

One of the best-known uses of shortleaf pine is for interior finish and trim. In general, shortleaf cuts from 30 to 35 per cent of clear stock. It is from the thick, clear sapwood that the highest grade of

interior finish is manufactured and it is practically free from resin, and beautifully marked; a strong, clear, bright, compact timber, soft in texture, readily smoothed and joined.

As a finishing wood there is absolutely no successful substitute for shortleaf pine and leading architects are specifying it and builders are using it more and more for the finest homes all over the country. It is preferred because of its more striking grain, soft and beautiful texture, which particularly adapts it for fine joinery. No other wood that grows offers such a wide range of choice in grain and figure. There is no sameness in the shortleaf figure; some of it is large and bold, some fairly uniform and much of it is delicately engraved.

SHORTLEAF OR SOUTHERN YELLOW PINE LOGS READY TO BE HAULED TO THE MILL

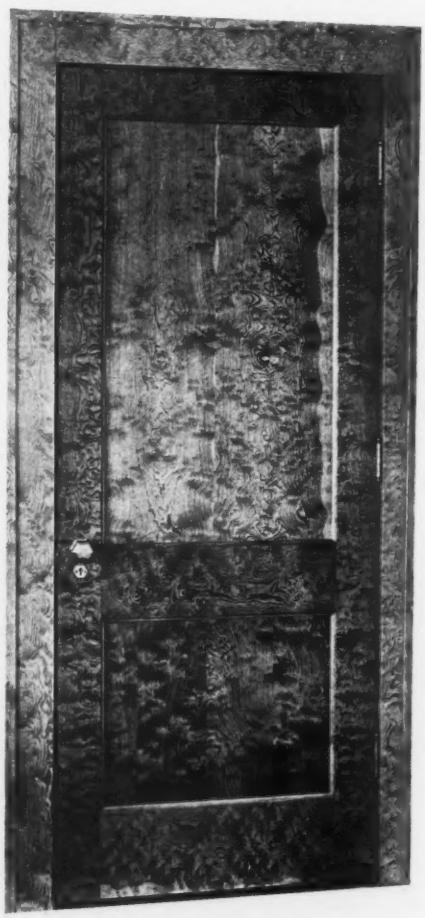


USING WASTE OF SHORTLEAF PINE

Lumber manufacturers are now giving more attention than ever before to using up waste. Here is an illustration showing the use of small pieces.

Shortleaf pine does not "fuzz up" or show "knife marks" in the planing mill process; therefore it requires less labor and expensive hand scraping to obtain a smooth, satin-like surface. It is not only bright and attractive but it hardens with age, and its general beauty and utility are not surpassed by the most expensive hardwoods.

Shortleaf pine not only takes and holds paint perfectly and permanently, but no effect of richness and beauty in color and tone is beyond the possibilities of the builder with this wood, and at a cost much less than that entailed in the employment of any other variety of anything like the same intrinsic merit. There is absolutely no color or tone effect in perfect, permanent interior finish that cannot be obtained with the use of high-grade shortleaf pine properly treated. On account of its absorbing qualities and absence of pitch, it takes paint well and there is no discoloration caused by the boiling or oozing of the pitch through the pigment. The first coat of stain or lead and oil is absorbed to a nice degree of penetration. This wood is especially suited to use as a base for white enamel. The white surface will not be stained from underneath.



USED FOR A DOOR

The curly effect of the southern yellow pine is shown to unusually good advantage in this photograph.

The absorption of the flat white coat is perfectly uniform and the fine texture of the wood prevents any trouble from raised grain. The enamel coats are very smooth and

the result is equal to that obtained on more costly woods.

Shortleaf pine grips the nail firmly. The fibers are straight and tough and the wood cuts readily and still will not split easily when nailed. This permits of making knife joints at all toe-nails and miters. It is used for outside trim—cornice, corner boards, outside base, window casing, siding, porch columns, flooring, and ceiling.

A NOVEL VIEW OF SHORTLEAF PINE

A view from the ground upward to the tops of a group of shortleaf yellow pine showing the narrow crown and the straight clean bole which is typical of the species.

Shortleaf edge grain flooring is a "quarter-sawed" flooring, and is frequently called "rift sawn" or "comb grain." The cut is across the annual rings. It is especially desirable for all high-class floors in residences. A room of any width from eight to twenty feet may be laid in one length of flooring, eliminating joints and producing a floor of mirror-like smoothness. It is easily finished by any process, presents a splendid appearance, and gives excellent floor service. It has been specified for many years by conservative architects and contractors because by its use their results have been so uniformly satisfactory. Invariably they have recommended it to their clients for floors of large area, where strength, good service, smoothness and staying qualities are absolute requirements, and for high-class house-flooring where artistic appearance, good wearing qualities, cleanliness and sanitation are essential floor necessities.

Shortleaf pine laths are light to handle, easy to nail, and do not tend to split, since they are soft in texture and tough in fiber. They are practically free from pitch, wane and knots. Cabinet-makers often prefer shortleaf pine because it is more easily worked, has less resinous matter, and finishes well.

Most of us are familiar with the ordinary household uses of this wood—its use for furniture, house-building, farm construction, implement manufacture and repair, and cars and other vehicles in which we ride. Many of us know that it is among the most important of woods used in ship-building and that it is extensively employed in the making of our play-outing goods and musical instruments. But in addition to these more or less well-known uses it has many others which the average person would never suspect.

Some of the uses of shortleaf are given in the following list:

Agricultural implements.	Furniture backs.
Balusters.	Grill work.
Baseboards.	Hand rails.
Blinds.	Head blocks.
Boat construction.	Ice boxes.
Bottoms (vehicles).	Interior trim.
Boxes.	Kitchen cabinets.
Brackets.	Ladders.
Cabinet work.	Lawn swings.
Cabinets.	Mantels.
Car decking.	Moldings.
Car siding.	Newel posts.
Cases.	Panels (veneered).
Casing.	Partition.
Ceiling.	Pickets.
Clapboards.	Roofers.
Columns.	Sash.
Cores (veneer panels).	Screen doors.
Cornice.	Sideboards (built-in).
Crating.	Siding.
Display racks.	Silos.
Door frames.	Stairways.
Doors.	Tobacco cases.
Drill boxes.	Trunk boxes.
Excelsior.	Wagon panels.
Finish.	Wardrobes.
Fixtures.	Window frames.
Flooring.	

Lumbermen are becoming thoroughly awake to the possibilities of the utilization of waste materials. Contemplating the diminishing timber supply and the greatly increased cost of production of building material, they are expending millions of dollars in research work devoted to finding uses for the "odds and ends" of wood formerly discarded without a thought of their possible utility.

What has already been accomplished along that line, especially in the great southern yellow pine forests, would amaze an "old time" lumberman out of touch in recent years with changing conditions. Research work in field and laboratory has developed so many new uses for lumber "culls" and waste materials that to-day the southern yellow pine interests, like the packing interests, come

pretty near utilizing "everything but the squeal."

Turpentine, rosin, excelsior, charcoal, and pine tar are important by-products, which are now being made in quantities from wood fragments formerly destroyed by fire. Pine oil, used in the manufacture of varnishes and paints, is a comparatively new product from waste, obtained by distillation. The mill scraps, shredded and subjected to chemical treatment, yield a pulp that is made into the strongest wrapping-paper known. Longleaf pine has been used almost exclusively in the experiments and manufacture of natural color kraft pulps and papers, but the similarity of the wood of shortleaf and longleaf makes it probable that further experiments will show a like use for shortleaf. Uses have been found even for the pine needles, the "leaves" of the tree, which, distilled green, yield an oil of balsamic odor, while boiling the needles in a solution of alkali produces "pine wool," a fibrous substance that is carded into fabrics or used in upholstering.

SHORTLEAF PINE FOR INTERIOR TRIM

All of the trim and panelling in this room are of the curly southern yellow pine, finished in natural color. Note the beautiful grain in the broad panels.

Government statistics do not distinguish between longleaf and shortleaf in giving the annual consumption of southern yellow pine in the various manufacturing industries. However, shortleaf has a very important place in the industries here mentioned:

The manufacture of boxes and crates consumes 10 per cent of the total annual lumber output of all woods in the United States, and southern yellow pine provides the material for one-fourth of all such products.

In railway car construction the annual consumption of lumber is 1,260,000,000 board feet—and southern yellow pine supplies 54 per cent of it.

In the manufacture of agricultural implements—plows, harrows, cultivators, drills, planters, threshing machines, rakes, etc.—300 million feet of lumber are used annually, and over 30 per cent of it is southern yellow pine.

In ship and boat building 200 million feet of lumber are required every year—and 53 per cent of that is southern yellow pine.

In the manufacture of trunks and valises, which requires 75 million board feet of lumber annually, southern yellow pine supplies 20 per cent.

In the manufacture of playground equipment, 16 per cent of all the wood used is southern yellow pine, and in the making of scales and weighing apparatus 24 per cent of the wood required is that same species.

Of all the excelsior produced, necessitating the consumption of 100 million board feet of lumber annually, 15 per cent is southern yellow pine.

To obtain the maximum service from any wood, however used, it is necessary to know something of the individual qualities of that wood. The specialists and the technical experts inform themselves along this line as a matter of course—and are the gainers by their knowledge. No less surely will the general run of us be benefited by a little accurate information concerning the woods best suited to our uses. A careful study of the merits and qualities of shortleaf pine will prove conclusively that it is entitled to high consideration as a structural and finishing wood.

THE Curse of the Forest," a motion picture of a real forest fire, showing methods of fighting and the devastation which follows in the wake of a forest fire, has just been completed by the Vitagraph Company of America in coöperation with the Pennsylvania Department of Forestry.

CALIFORNIA'S ever-threatening forest fires of the dry season hold a minimum of menace to the great tract of redwood trees, because the bark, several inches thick, is almost fireproof. The California redwood forests contain 80,000,000,000 board feet of lumber, and the trees have been standing since the beginning of the Christian era.

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WHERE ONCE THE TOWN OF MATHESON STOOD

This town was destroyed by wave after wave of flame, which swept across the almost flat country surrounding it, at a speed which caused total destruction of property and cost many lives. The photograph, taken from the window of a relief train, gives only a general impression of the havoc wrought by the fire. The air was thick with smoke and the fire still burned fiercely in piles of fallen trees when the photograph was taken.

Canada's Deadly Forest Fires

By Robson Black

Secretary, The Canadian Forestry Association, Ottawa

THE most disastrous forest fire in the history of Canada broke across the "Clay Belt" region of Northern Ontario on the afternoon of Saturday, July 29th. Within eighteen hours, more than 200 lives were forfeited, 1200 square miles of bush and clearing devastated, and the thriving towns of Cochrane, Porquis Junction, Iroquois Falls, Nushka, Kelso, Matheson and Ramore badly damaged or swept wholly from sight. What the loss means in terms of dollars is vaguely stated as between three and six millions, exclusive of forest damage. Hundreds of settlers' homes, their standing and harvested crops of hay, barley, oats, wheat, and potatoes, with much live stock, farm implements and the hard-won accumulation of years, were turned to drifting ashes and chunks of charcoal. The Temiskaming and Northern Ontario Railway lost one hundred freight cars, on some of which the steel wheels were melted by the sulphur cargo to shapeless pools. Railway stations in the heart of the fire were reduced to twisted skeletons, and mining companies lost every structure above the earth's level.

Had a hail of high explosive been let loose upon the bush lands from Matheson to Cochrane, the suddenness and violence of the catastrophe could not have been more terrifying. Drifting smoke of Thursday and Friday, rousing few apprehensions in a country accustomed to clearing fires, became by Saturday afternoon a smothering blanket of flame and gas and flying dèbris. Fierce winds drove the fire and smoke with such speed that only a broad river or lake, or an uncommonly wide clearing, was of much avail. Blazing pine tops hurled through the air, and where a home well separated from the bush seemed one moment in perfect safety, in the next it crackled with flames. Settlers and prospectors hastened toward the villages. Some reached their goal. Scores of others were smothered as they ran. Bodies were found lying across tree stumps; some held empty pails, some grovelled into the earth. One man took to a swamp before an advancing cloud of fire, while his comrade remained on a cliff. The cloud dipped into the swamp, consuming the body of the first fugitive, and swept over the head of the man on the cliff, leaving him quite unharmed. Veering winds accounted for surprising incidents, as when a house and its human contents would

be destroyed, while a hay rick a hundred yards distant would be spared. Settlers and their families, with homes bordering the rivers, took to canoes, upset them, and by

to the speed of the fire in this manner: "I had been fighting bush fires all day and returned for supper. At that time the smoke was curling about the far buildings,

THE RUINS OF FIRE-SWEPT MATHESON

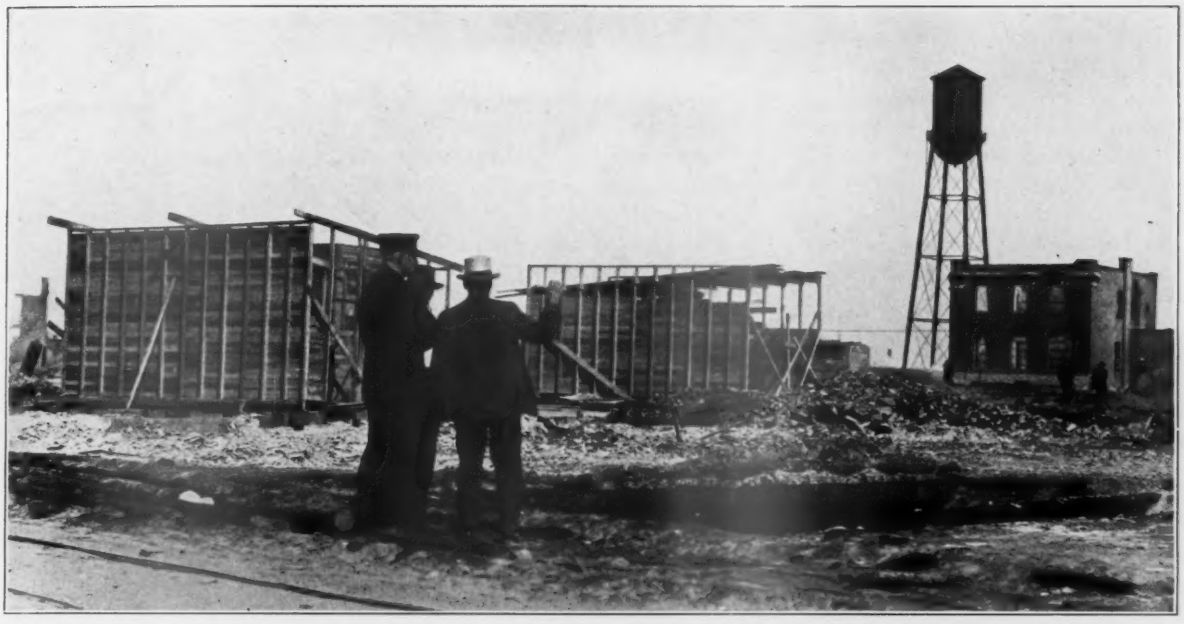
Another view of the fire-swept area at the unfortunate town. All around this town the fire has destroyed the timber to such an extent that there is none left for fuel, and this must now be transported for many miles.

piling wet blankets atop existed in such precarious shelter for hours. Two families, numbering fourteen persons, clambered into a well. The adults tore their clothes to strips and by stuffing the children's mouths with moistened pieces and covering their heads in a similar manner came through the night of Saturday free from injury. Fifty-four men, women and children, mostly French-Canadians, at Nushka, where the worst fire seems to have originated, raced frantically for a shallow cut in the railway; every one was smothered by heat and gases. Under culverts and in wells and mine shafts families were found burned to death; a tragic number of babies appears in the list of victims, and a further pitiful legacy is the large group of wounded now recuperating in hospitals and homes.

Evidence of the cause of the fire points directly to settlers' slash burnings which, week after week, were allowed to work their way into nearby bush, encouraged by the peculiar peaty character of "Clay Belt" soil. Lacking the supervision or control of fire rangers, for Ontario has no law restricting the settler, the intensely hot period of July brought along the logical penalty. Numbers of small fires joined forces and, whisked into action by the Saturday hurricane, turned township after township into a fury. Said one survivor: "The roar of the thing was awful. You could hear no person speak for the noise. Flames climbed up at times two hundred feet above the bush. I noticed little excitement, and most people appeared to be waiting unafraid. All the while the gale was increasing." Another settler gave emphasis but the actual conflagration was a mile away. My wife prepared the meal, a matter of a few minutes. Then she went to the front door and looked out. At once she returned, shouting that the fire was upon us. We had time just to reach the potato patch where we flung ourselves down and managed to find a thin layer of air close to the earth. The green vegetation seemed to hold up the smoke clouds, and after hours of terrified waiting we came through the ordeal without serious hurt. Every vestige of our home and stables was changed to charcoal." It is noteworthy that clearings of a quarter-mile about some of the towns were crossed by the fire, not alone by flying sparks, but by the blazing grass and stubble.

From the first violent action of the flames at Nushka on Saturday afternoon and evening, the swath of destruction took fresh bearings north and south. Cochrane, which stands at the junction of the National Transcontinental and the Temiskaming and Northern Ontario railways, with a population of 2500, was enveloped by fires originating in its immediate district, the business section being destroyed, with an estimated loss of $1,000,000. Matheson, the axis of a more southerly fire, was clean-swept, with the exception of three small houses on a hillock. To its grave-yard were brought the bodies of 135 persons from Nushka and the neighboring farming districts. The population of the town proper took to the clearings and came through safely with the aid of a freight train which, by good luck, had been stalled on its southerly trip by a burned bridge.

Beyond the limits of towns and villages, the picture



AFTER THE FIRE AT COCHRANE

Chief J. A. Crawford, of Cochrane police, and a couple of business men talking over the reconstruction of the town. Water-tank and the first new buildings appear in this photograph, for with typical enterprise the survivors began to rebuild long before the ashes of the fire cooled and just as soon as building materials could be rushed to the place.

before the writer's eyes was of a charred and lifeless expanse, the smoking ruins of homes, the stripped tree trunks, isolated heaps of pulpwood, and endless miles of forest dèbris. For great distances about Matheson, the land looks as flat as a prairie, and the process of slash clearing has undoubtedly been facilitated. Indeed, the clearing has been so thorough that one wonders where fuel wood and fence posts and small lumber will be secured in future, and what prices will be paid. In other districts, the fire's effect has been to reduce the slashings and loosen the roots, while merely killing the green bush and exposing the district to a vastly greater disaster in future years of drought.

The refugees looked upon such scenes and such prospects with remarkable stoicism. Men and women and frightened groups of children gathered about the station platforms, wearing garments from the Government relief train and munching from boxes of emergency food, waiting solemnly for the next turn in the terrible drive of events. Sometimes whole families found themselves united, but the rule of the day was of broken households.

While the fires swept through every ounce of kindling

Photograph by British and Colonial Press, Toronto.

ARRIVAL OF THE RELIEF TRAIN AT MATHESON

Only the stone walls of the station remain standing. Fortunately the railroad was not destroyed and it was possible for relief trains to take supplies to the destitute, and physicians and nurses for the injured survivors.

that stood in the road, relief measures were under way. With appropriate vigor, a train-load of provisions and equipment was sent from North Bay on Sunday morning and every town beyond the devastated area hurried motor cars with doctors and nurses to render service.

By such means the hopelessness of the situation was a good deal relieved. Private and governmental agencies carried in food and clothing, and burying parties removed the scores of coffins collected about the railway tracks and roads. Light rains, commencing Sunday morning, spread across the blackened country and, increasing in volume, gave the people their first hint of cheer. Hundreds had, of necessity, taken train for Southern Ontario; others were in hospitals of the railway towns beyond the danger zone, and a luckless remnant located themselves in the temporary villages of tents until the way should open for a fresh start at farming.

Photograph by British and Colonial Press, Toronto.

ANOTHER SCENE WHICH WITNESSED TRAGEDY

View from Nushka showing cut up the track where 54 people lost their lives. Only four people escaped from this town. Of those who took refuge in the narrow cut everyone was smothered by the heat and the gases from the fire.

Government aid was immediately assured to the extent of partial rehabilitation of the sufferers, special agents were appointed, and provision made for housing and food supplies. To advise the Government regarding a permanent policy on all matters connected with the restoration of working conditions, a business committee was convened by the Minister of Lands and Forests and will investigate and report.

Such is the general outline of a catastrophe burdened with the most terrible and poignant incidents and relieved, too, by plentiful tales of heroism. It was the second severe fire within five years in the same part of Ontario. The penalty of the Porcupine fire of 1911 was 84 lives and covered an area very much less than that of the 1916 disaster. In neither case was the forest growth of large size or maximum value, although the future will be in a better position to estimate exactly what the sacrifice of forest growth amounted to. The service rendered in the clearance of agricultural lands (where a slash had already been made) is naturally looked upon as a godsend. No minimizing of the fearful toll of life, however, is possible and Northern Ontario regards its latest experience as too overwhelming to be weighed against real or pretended "benefits."

The "Clay Belt" fire of July, 1916, will rank as one of the greatest forest disasters in American history. The Hinckley fire in Minnesota, 1894, was responsible for 418 lives and the burning over of 160,000 acres. The famous Peshtigo fire in Wisconsin, 1871, killed 1500 and devastated 1,200,000 acres. In 1825 occurred the Miramichi fire in New Brunswick and Maine, with a loss of 160 lives and damage of 3,000,000 acres. The Clay Belt fire in Ontario, in point of lives lost, ranks third in the records of the continent, although the sacrifice of merchantable timber (under present conditions and present market values) is by no means a noteworthy distinction.

The Cause of the Fire—And Future Prevention

By Clyde Leavitt

Forester, Commission of Conservation of Canada

THE terrible loss of life, and of property as well, in the recent forest fires in Northern Ontario, must cause thinking people to take stock of the situation,—to try to understand how such a thing could happen, and to determine what measures must be taken to prevent a recurrence.

The explanation of the disaster is, to a certain extent, to be found in the character of the country itself. In the autumn of 1912 Dr. Fernow made a brief investigation, for the Commission of Conservation, of forest conditions along the National Transcontinental Railway for a distance of about 200 miles east and west of Cochrane, as well as south from this point, along the Temiskaming and Northern Ontario Railway. Dr. Fernow discusses, therefore, in his report, the situation in the very section devastated by the recent fires. He reported that much of the country is more or less swampy, due to the underlying stiff clay. As might be expected from this, the

character of the timber is, to a considerable extent, disappointing from a commercial point of view. Probably 60 to 70 per cent of the trees are black spruce, 10 to 15 per cent white spruce, 15 to 20 per cent aspen poplar and balm of Gilead, and 5 per cent miscellaneous species, mostly cedar, paper birch and jack pine. Hardly 10 to 15 per cent of the forest contains material of saw-timber size; from 35 to 50 per cent contains material suitable only for pulpwood or fuel; from 35 to 45 per cent of the area is either muskeg, near muskeg, or scrubwood of a size hardly fit for fuel. The soil, when cleared, is for the most part excellent for farming. Drainage is, of course, necessary in the case of swampy areas. Considerable settlement has already taken place, and the region is destined to become an excellent agricultural section.

At the time of Dr. Fernow's visit, fires had been pretty well kept out of the country along the Transcontinental, but only the year previous (1911), the terrible Porcupine fire had swept over a large stretch of country around Porcupine, and south and east from that place, destroying the timber on hundreds of square miles and causing the loss of not less than 84 lives. Numerous other fires had occurred, both before and since, so that there were large areas of fire-killed timber, as well as of clearing slash, ready to hand, constituting the worst kind of a fire trap. To a certain extent, therefore, the recent disaster is the result of secondary fires. Previous experience in Michigan, Wisconsin, Minnesota, and many other parts of the country, shows that such fires are more serious than fires in green timber. This is due to the fact that the first fire does not consume the green timber entirely, but sweeps through the tops, perhaps burning out the roots as well, killing all growth and leaving it to become exceedingly inflammable and to constitute food for a second or succeeding conflagration. It usually requires not less than three or four successive fires to completely clean up an area of standing timber. While the recent fire has furnished the finishing touch over considerable scattered areas, large amounts of highly inflammable material still exist over the great majority of the recent burn. There will still, therefore, be great danger of serious fires in the region swept by the

Photograph by British and Colonial Press, Toronto.

THE TEMPORARY MORGUE AT MATHESON

These two tents were erected at Matheson for the reception of bodies brought in from the surrounding district. The soldiers shown are members of the 228th Northern Fusileers, who are searching for bodies and otherwise assisting with relief work. A number of coffins are shown, some empty and some containing charred remains. The work of rescue and relief was quickly organized and admirably conducted.

recent one, unless adequate preventive measures are taken.

One of the inducements held out to prospective settlers in the Clay Belt of Northern Ontario has been the opportunity to make good wages by cutting and marketing pulpwood, thus making the operation of clearing the land pay for itself. While this argument has been justified in cases where the class of timber is favorable, and where the haul to the railway or drivable stream is not too long, there are other cases where the conditions are less favorable. In such cases, many of the settlers have shown an inclination to regard the timber on land desired for cultivation as a liability instead of an asset.

This condition has led, perhaps naturally, to the feeling on the part of many that fires would be a blessing, since they would hasten the day when large areas of agricultural land could be placed under the plow. Also, many prospectors consider fires a distinct advantage, since they lay bare the mineral soil, and thus facilitate the discovery of valuable minerals. Whether rightly or wrongly, the Porcupine fire of 1911 was attributed, at least in part, to fires started by prospectors with this object in view. This attitude on the part of a proportion of the resident population, particularly the settlers, would naturally make it difficult for a government to take adequate steps for the prevention and control of forest fires in that section. It goes, of course, without saying, that no one really contemplated such a holocaust as that which has just occurred. As long, however, as no lives were lost or large amounts of improved property destroyed, it is probably safe to state that a considerable proportion of the population of the Clay Belt regarded the occurrence of forest fires with a good deal of equanimity. No particular attention was paid to smouldering bush fires, which were started in large numbers for the purpose of clearing land at any time the settler might choose. There is no adequate provision for the regulation or control of such fires in the Clay Belt, and real attention to their extinguishment has been largely lacking until such action has been rendered almost or quite too late by the occurrence of a prolonged hot, dry spell, such as took place during the last half of July. Only the occurrence of heavy rains prevented the fires from assuming the proportions of a much greater calamity than actually took place.

Photograph by British and Colonial Press, Toronto.

A TYPICAL GROUP OF REFUGEES WAITING ON THE PLATFORM AT ENGLEHART
(Note Women and Small Family)

Many of these not only lost all their property but a number mourn the loss of relatives and several of them escaped by seeming miracles.

It must not be understood that Ontario is giving no attention to the matter of forest-fire protection. On the contrary, a large amount of money is being spent annually on this work. The system has, however, a number of vital weaknesses.

The Dominion Forestry Branch estimates that Ontario has 70 million acres of land capable of yielding merchantable timber, or one-half the total area of the province. Of this, about 13 million acres are included in provincial parks and forest reserves, and about 10 million acres are under license to cut timber under specified conditions, the land itself remaining the property of the Crown. Some of the timber limits being within forest reserves or parks, it is safe to estimate that there are something like 50 million acres of unlicensed Crown timber land not included in parks or reserves, and exclusive of non-productive areas. There is very little timber land in private ownership in the province of Ontario.

The annual revenue which the province receives from timber licenses amounts to upwards of $1,500,000 annually. The holders of timber licenses are required to provide and pay the necessary staff of fire rangers on licensed lands, subject to supervision by the provincial authorities. Protection on other Crown lands is to be

furnished direct by the Government, where such protection is considered worth while. As a rule, of the unlicensed and unreserved Crown lands, it has been considered practicable to provide fire protection on only those portions which contain quantities of white and red pine. Thus, there are large areas of land containing a poorer quality or quantity of timber which are left practically or altogether without protection. The area of such lands is so great that the Provincial Government has not felt justified in incurring the large additional expenditure that would be involved by the establishment of a patrol system.

ONE OF THE MANY SAD SCENES

Unloading coffins of victims of the fire at Ramore. At each station along the fire-swept district, dead and injured from the surrounding country were gathered as quickly as possible by volunteer relief parties.

The report of the Department of Lands and Forests of Ontario for 1915 shows that about $300,000 was spent on forest protection in the province during that year, of which apparently about $230,000 was expended by the Provincial Government. The cost of fire-ranging on licensed lands was approximately $70,000,—286 men being provided for this work by licensees. The total cost to the province for patrol of forest reserves was $67,313,—166 men being assigned. On unlicensed Crown lands, 107 men were appointed, costing $54,925. For the patrol of the National Transcontinental and Temiskaming and Northern Ontario Railways (owned by the Dominion and Provincial Governments respectively), 126 men were provided by the province, costing $56,326. There were 18 chief rangers, 5 deputy chief rangers, and 8 supervisors on lands under license. In addition, 12 railway inspectors were provided to enforce the provisions of the Railway Act and the fire regulations of the Railway Commission as to privately owned railways. The cost of patrols in the parks is not stated, nor are figures available showing the total amount expended for extra labor in extinguishing fires. The privately owned railways are required by the Railway Commission to take full precautions with regard to the reporting and extinguishing of their own fires, and they are, as a rule, performing this work in an admirable manner, and help as well in controlling many fires from the outside. The cost of this work does not appear in the figures above quoted.

It will thus be seen that a great deal of money is being spent on fire protection in Ontario. Why, then, is it possible for such a catastrophe to occur as has just devastated so large a section of Northern Ontario? The answer will be found in the discussion of the following points, which have been emphasized time and again in representations made to the Provincial Government by the Commission of Conservation and the Canadian Forestry Association.

1. There is no definite policy for the clearing of land in the north country, preliminary to settlement. Clearing is left entirely to individual initiative, supplemented by accidental fires. There is no regulation of settlers' slash-burning operations, and it is usually the careless settler who naturally selects the driest time to burn. It should be noted that reports indicate settlers' fires as the agency responsible for the recent holocaust. It has been suggested that the province should adopt some general scheme of at least partial clearing, ahead of settlement. The clearing, by the government, of a strip extending back some distance from each road allowance, would enable the settler to make an immediate start in raising a crop, and would at the same time break the forest up into blocks, thus greatly increasing the chance of controlling fires. The difficulty of this will of course be the cost which the prospective settler would be required to repay in the course of time. It is believed, however, that this need not be prohibitive. In any event, in the light of past and recent experience, it would appear that the province should make a complete study of the whole situation and determine definitely and finally what areas are chiefly valuable for agriculture and which are chiefly valuable for continued timber production. As to the former, some definite policy should be adopted for the removal of the timber that will have due regard to the safety of life and property. As to the latter, adequate

fire protection must be provided, in order to assure a sufficient supply of timber for local needs, permanently. Also, beyond any question, an act should be passed prohibiting the setting out of clearing fires during the fire season, except on permit signed by an authorized forest officer. This plan is now in effect in British Columbia, Quebec, Nova Scotia, to a limited extent in New Brunswick, and also in the Dominion forest reserves. Similar provisions exist in a number of the states. It has proved conclusively that the extreme danger resulting from the unregulated burning of settlers' slash can be kept within reasonable bounds. There is no reason why a similar requirement should not be made effective in Ontario. A strong campaign to this end is now being waged, particularly by the Canadian Forestry Association. Many boards of trade are taking the matter up in a vigorous way and all this agitation must have an effect. It is to be noted that, for instance, Minnesota did not provide really adequate forest fire protection until after the disastrous experiences of the Chisholm and Baudette fires. It is to be anticipated that history will repeat itself in Ontario as well. The warning of the Porcupine fire of 1911 was not heeded, but adequate action is now imperative, unless the development of the Clay Belt is to be retarded indefinitely, on account of the unwillingness of present and prospective settlers to face the unnecessary hazard, by fire, to life and property.

2. The whole fire-protection service of the province should be reorganized, and extended to cover vast areas now left unprotected. Unlicensed and unreserved Crown lands need much more attention than they have ever received. This is particularly true of the Clay Belt, where relatively little has been done aside from the patrol immediately along the railway line. Unless this action is taken, there will inevitably be periodical repetitions of this year's disaster, until the country is swept practically clear of timber. There must also be a radical change in the point of view which permits small fires to smoulder unattended, until they become large ones and escape control. The reorganization of the service should include adequate provision for competent supervision of the staff, all the way from the head office down to the men in the field. The present provisions in this regard are far from adequate. Some one competent man must be designated to give his whole time to the general supervision of this important work, and he must be given a much larger staff of inspectors, in addition to an increase in the ranger force. Further, the work of the rangers should be facilitated by better provision for communication and fire-fighting. This means the construction of more roads, trails, portages, telephone lines, lookout stations, tool caches, etc. Without this mechanical equipment, it will be impossible to organize the work on a really modern and up-to-date basis. A beginning in this respect has been made in some of the forest reserves and parks, but the situation as a whole is relatively undeveloped.

3. Provision is badly needed for the reduction of the fire hazard, through the disposal of inflammable dèbris in certain locations. For the protection of towns and settlements, fire breaks should be cleared around them. In Minnesota, under the fire break clause of the forestry law relating to municipalities, the State Forest Service has brought about the cleaning up of a great deal of slash and brush around many villages in the northern part of the State. This has usually taken the form, according to the State Forester, of a cleared and plowed strip, perhaps two rods wide, a quarter to a half-mile from the town, on the sides threatened. The space between the cleared strip and the town is, of course, cleared of all slash and the brush burned, or it is cultivated or pastured, if possible. The State Forester holds the opinion, in view of the experience of Minnesota, that settlements are best protected by systematic disposal of slash and dèbris throughout the locality, with the additional aid of a system of roads laid out to provide necessary cleared strips on the outskirts of the settlements.

It goes, of course, without saying, that in connection with the construction of colonization roads, full provision should be made for the piling and burning, within the road allowance, at a safe time, of all dèbris resulting from road construction. For the most part, this action has been taken in the Clay Belt. Only too frequently, however, in many parts of Canada and the United States, is the road slash left piled in windrows along the roadside, thus constituting a severe and unnecessary hazard, and preventing the road from serving the useful purpose of a fire-break in case of need. A good fire-break should not only be a vantage point from which a back-fire can be started, if need be, but it should also serve as an avenue over which men and supplies can be transported to fight fires. Roads may be made to serve the former as well as the latter purpose, if proper foresight is used. Railroads, ditches, tote roads and trails should also be considered in the general scheme of fire protection and utilized as fire-breaks wherever possible.

State Forester Cox reports that if the work is properly laid out along these lines, the cost should not be prohibitive. He finds that one of the most effective means of cutting down the number of fires in Minnesota has been the completeness with which all slash along highways, ditches and other rights of way has been cleaned up. It has meant unending work on the part of the rangers to bring about this condition, but, according to Mr. Cox, the results have justified all the trouble taken. The experience of Minnesota and of the United States Forest Service in this respect will no doubt be considered by the Government of Ontario, and it is hoped that suitable provision will be made, legislative and administrative, for putting similar measures into effect in that province.

The whole question of the disposal of logging slash, as a fire-preventive measure, has, as yet, hardly been touched anywhere in eastern Canada. Some small experiments have been made by different agencies, and information relative to the general situation both in Canada and the United States has been published.

If the loss of probably not less than 250 lives and of millions of dollars' worth of property in the recent disaster shall result in the adoption of really adequate measures for fire protection in Ontario in the future, the sacrifice will not have been altogether in vain.

Mount Rainier National Park

By Mark Daniels

Former Superintendent of National Parks

THE ranges of mountains that run in a more or less continuous line from southern California practically to the Canadian border are accented here and there, as it were, by peaks that raise their lofty crests far above the surrounding territory. Beginning at the southern end of the Sierra Nevadas with Mount Whitney, that range of mountains is marked in its middle portion by Mount Lassen and at its northern extremity by Mount Shasta. Passing on into the mountains of Oregon and Washington in the Cascade range, there is Mount Mazama, the top of which was blown off in times gone by, leaving the cup that now contains beautiful Crater Lake. Further north are Mount Hood and Mount Rainier, whose snow-crowned crests are visible for miles and miles throughout the surrounding territory.

With the exception of Mount Whitney, each of these peaks bears undisputed evidence of volcanic formation, with Lassen peak giving frequent evidences of its determination not to be taken from the category of active eruptives. On the top of Mount Shasta there is a hot spring which gives off steam within a few feet of perpetual snow and ice, and on Mount Rainier it is quite possible to dip out sufficient hot water from beneath the wall of a glacier to brew a grateful pot of tea without the use of fire.

Of all the peaks in the United States that stand out in marked contrast to the surrounding country, Mount Rainier is the undisputed peer. It is the Fujiyama of the United States. It stands out alone, almost detached from the remainder of the range, towering to a height of 14,408

THE ROAD FROM TACOMA, CALLED THE TACOMA "HYPHEN" NATIONAL PARK ROAD

This road, which leads to Rainier National Park, bursts out of the wonderful forest of pines onto a clear plateau that overlooks the valley which lies at the base of the great mountain. The road from the city to the Park is smooth, well built and beautiful. Inside the Park the condition is such that patriotism forbids comment on all but the scenery.

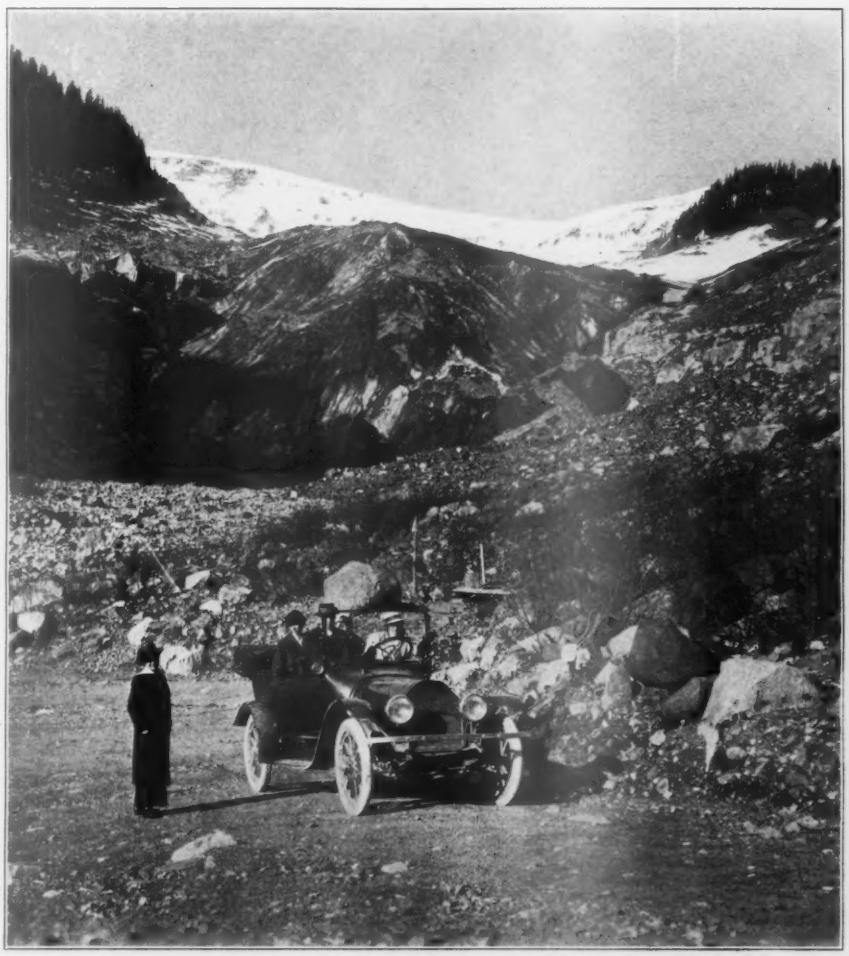
feet, with practically all of its height above the surrounding territory. Most of our other peaks, such as those in Colorado which rise to an altitude nearly equal to Mount Rainier, can be seen only from territory that is in itself at a great altitude, but Mount Rainier may be clearly seen from the waters of Puget Sound, on whose placid surface on a calm day the reflection of this sparkling mountain in the distance is a wonderful sight to behold.

The mountain is so ever-present as not only to dominate the situation, but to intrude its individuality and

SECRETARY OF THE INTERIOR FRANKLIN K. LANE'S PARTY AT NISQUALLY GLACIER, RAINIER NATIONAL PARK

Secretary Lane was once engaged in newspaper work in Tacoma and his picture near the glaciers of Mt. Rainier may be found in the windows of many photograph shops in that city. Dr. A. C. Miller, of the Federal Reserve Board, is seen on Mr. Lane's left. If the truth were told, it would be more generally known that Dr. Miller really conceived and launched the movement for an intelligent and comprehensive plan for the development of our National Parks. It was during his term as Assistant Secretary of the Interior that this picture of Secretary Lane and his party was taken, at the snout of Nisqually Glacier.

influence into the very social fabric of the surrounding towns. Nearly every inhabitant of the district, who pretends to such a thing as a garden, will take the itinerant visitor to the back porch, or veranda, or terrace, as the case may be, and point out how he ingeniously contrived the arrangement of his garden so that the snow-white peak of Mount Rainier terminated the vista along the major axis of his garden. While no claim is specifically laid to originality and uniqueness on the part of the garden owner using our national park as the major element in his plan, the visitor will, nevertheless, come away with the impression that there is at least one man in Washington who appreciates the beauty of one of nature's masterpieces. If, however, he visits more than one garden, he will, more than likely, conclude that the inhabitants of the districts are not at all sociable, for none seems to know that his neighbor's garden is axed on the same glorious peak.



THE NISQUALLY GLACIER

The snout of Nisqually Glacier reaches down to within a few hundred yards from the highway. The dark mass in the center is the glacier, although it looks more like a heap of earth than a giant cake of ice. The first view of a glacier's toes is always one that destroys any youthful ideal as to the "huge wall of sparkling ice."

The mountain is of such a commanding height that it is plainly visible from Seattle and Tacoma, in fact so much so, that to the residents of these two cities it has become part and parcel of their local scenery. What, then, could be more natural than a struggle for its control? Before its discovery by the whites, the mountain was called Tacoma by the Clickitats, Yakimas and other Indian tribes of the district. So far as I have been able to learn, this name means "the great snow." The naming of the peak, "Mount Rainier," in honor of Rainier, the famous explorer, has therefore, for many years, been a thorn in the side of the residents of the city of Tacoma. A feud finally developed between the two cities for the possession and control of the Park's development, and this feud grew to such an extent that many dear friends were estranged and there was naught but bitterness between them. The story is told of one of our prominent national characters, who, in his visits to these two cities for the purpose of gathering the autumn crop of votes, became so confused that he could not keep in mind when he should call it Mount Tacoma and when Mount Rainier. His secretary had advised him, therefore, in his speeches in the two cities to call it only "the mountain." At the end of an arduous day in Seattle he closed his speech before a large gathering with his impressions of the beautiful snow-capped peak and terminated his sentence with the words "Mount Tacoma." His secretary was on the platform and when he heard this he uttered a deep groan and said, in a voice that was plainly audible to the twelve hundred enraptured listeners, "Hell, now you've lost twelve hundred votes!"

An account of the struggle and how the trend of battle ran through years would fill a small volume which, as a matter of fact, has no part in this argument. Suffice it to say, however, that the hatchet has been buried and there is now an organization composed of citizens of both communities who work in apparent harmony for the benefit of the Park; so much so, in fact, that by virtue of persistent pounding they have secured a sufficient appropriation from Congress to actually build some new bits of road in the Park.

There are few places in the world one may drive an automobile right up to the snout of a mighty glacier. The only place in the United States that I know of where

this can be done is in Mount Rainier National Park. There is a highway leading out of Tacoma which (it must be stated, lest another feud be started, leads also from Seattle) passes through a forest of Oregon pine that is unsurpassed on any motor highway in the world. This road enters the Park almost exactly at its southwestern corner and traverses a mile or so of the Park and then runs out and in again for another two miles, finally entering the Park about a mile from Longmire Springs. From here on it follows the Nisqually, climbing through a difference in elevation of 1500 feet to within a few hundred yards of the snout of the Nisqually Glacier.

JOY SLIDING ON AN AUGUST DAY, RAINIER NATIONAL PARK

Strangely enough, there is only a slight accumulation of moisture in the clothing when this form of pastime is engaged in. Such times, however, are infrequent, for the minds of even the hardiest of mountain climbers are fully occupied with the problems of the ascent. The snow, in almost every instance, is quite dry and extends temptations to sport lovers but their joy is generally short-lived.

The appearance of this portion of the glacier is quite disillusioning, for the lower end of the "river of ice" is covered with dirt and disintegrated stone so that it is hardly recognizable as snow and ice. From this point the road swings around the exceedingly steep wall of the canyon to Ricksecker Point. For a half mile around this point the view is stupendous. The Tatoosh range of mountains is just across the canyon, into which it casts the purple shadows of its jagged peaks. From Ricksecker Point the road climbs steadily through a vertical distance of 1500 feet to Reese's Camp in Paradise Valley. Every turn of the road displays to view some new and startling formation of the Tatoosh range as well as intimate peeps of the glaciers on the mountain slope.

Whoever named Paradise Valley did so, I am certain, with no intent to exaggerate. It is a fairly open stretch of grass-covered land, perhaps a mile and a half in length, strewn with the most marvellous variety of wild flowers imaginable. With the sparkling white snow and ice in the background, the kaleidoscopic colors of this little valley and its surrounding slopes present a picture in color harmony that would test the versatility of a Brangwyn. Surrounding this wonderful place are a great number of spots almost equally beautiful though less aptly named. There is a small creek called Edith Creek, a beautiful miniature plateau called Frog Heaven, Stevens Glacier, and, as might be expected, another of the innumerable Louise Lakes. I have never checked it up, but I doubt if there is a picturesque spot equal in area to Mount Rainier National Park which has not a Louise or Eleanor Lake. In the case of Glacier National Park the committee on names varied their nomenclature applied to the category of beautiful lakes to such an extent as to call one of the lakes "Lake Ellen Wilson." What ingeniousness! What wonderful imagery! We are truly coming on apace. It only remains to change the name, in honor of our coal barons, from Tatoosh Range to Gas Range to show the world that we are a truly modern people, up to all of the little tricks of the trade that substantiate our claims for a high position amongst the nations of higher civilization.

Unfortunately, the automobile cannot carry the tourist further into the Park than Paradise Valley, which is really just over the line. From this point, to and through 200,000 acres beyond, one must travel afoot or horseback. Congress has been, for once, more or less justified in displaying a "reasonable" amount of reticence over

the building of an encircling road, for there are canyons and hogbacks that reach down from the crest of the peak in a way that is well calculated to discourage the most intrepid road builder. Added to these are a series of huge glaciers thrusting their snouts out into the surrounding territory like the tentacles of an octopus that discourage the over-ambitious; nevertheless, a highway has been planned and, in fact, tentatively surveyed, which would encircle the mountain, giving access to the innumerable

Many people who have climbed the Alps would undoubtedly be inclined to disparage Mount Rainier if they had not been there, but no less an authority than Professor Joseph N. Le Conte gave it as his opinion that there was no single system of glaciers in Switzerland which could surpass the system that crowns Mount Rainier. Just how glaciers are counted, when most of them seem to join in one solid mass of ice, I do not know but I have heard it stated, by those who have had lessons in plain and fancy

BIG CEDARS IN RAINIER NATIONAL PARK

The charms of Mount Rainier National Park are not confined to glaciers and misappropriated masculine costumes. There are verdant forests of giant cedar which cast their somber shadows across the paths like deep purple mottles upon the carpet of inviting green. These trees are among the largest of their species in the world and possess an individuality that is surpassed only by the strange and weird impressiveness of the California sequoias.

wonderful valleys, canyons and glaciers that abound on all sides of the peak, and it is to be hoped that sooner or later this road will be built.

From Paradise Valley there is one established route for reaching the summit. The trail of this route follows along the hogback from Paradise Valley over the most easily negotiated snow fields to a point called Camp Muir at an elevation of 10,000 feet. From there the climbing becomes arduous and somewhat dangerous. It is, in fact, so dangerous as to be unsafe for those who are not experienced in negotiating glaciers and should not be taken without a guide.

counting, that there are over twenty-five glaciers in this Park, and that these glaciers cover an area in excess of forty square miles. The names of some of these glaciers are particularly interesting. There are the Frying Pan, Emmons, Winthrop, Russell, Flett, Success, Van Trump, Wilson and Stevens Glaciers. One is curious to know whether the list of proper names was exhausted before Tahoma Glacier was given its beautiful, musical name.

On the eastern slope the glaciers seem to be broken and more disconnected than on the northern slope, but the surrounding country is not less beautiful. The glaciers that extend to the north are considerably larger

than those on any of the other sides of the mountain. This is only natural, as the northern slopes receive much less sun. The Carbon Glacier is perhaps the longest in the system and reaches down to form the source of the Carbon River. Lying between the Carbon Glacier and its nearest big neighbor are Spray Park and Seattle Park,

PARADISE PARK AND TATOOSH RANGE

The Tatoosh range presents, as true lovers of mountain scenery view it, the most picturesque view in the Park. The serrated crest of the range is sharply defined by the southern sky, against whose brilliant blues the towering pinnacles stand out like watch-towers of fairyland.

the latter being one that is seldom mentioned in the vicinity of Tacoma. It is a bit confusing to find that most of the beauty spots inside the National Park are themselves named Parks, such as Vernal Park, Moraine Park, Spray Park and many others.

An unfortunate circumstance in the present arrangement of roads entering the Park is that they are in no way connected up within the Park boundaries. As a result, if one wishes to visit the great number of wonderful sights and to become familiar with the variety of scenery that is available, it is necessary to back out and attack the Park from some other point of entrance. It is quite possible to reach a point near the northwestern corner of the Park by automobile, from whence the Mother Mountain country and the Carbon and Russell Glaciers can be reached by trail. There are practically no facilities, however, for pack train travel in this imm diate district, and to get from this country over to the northeastern or southeastern corners one must retrace and attack the problem again.

There is, undoubtedly, no district in the United States of the area of Mount Rainier National Park which has such a tremendous diversity of scenery or is so broken by canyons, mountain walls and glaciers. For this very reason the tourist or mountain climber who visits the district is immediately fired with a burning desire to exhaust at least a portion of its tremendous scenic resources, and his humor is in no wise softened by the knowledge of the fact that the money necessary to build an encircling highway about the peak was consumed last year by the expenditure of $200,000 for the erection of a white stone postoffice in Squeegee, North Dakota.

It would seem that the exigencies of political expediency alone would be sufficient to secure an appropriation from Congress for the proper development of this Park, for it lies within a short automobile ride from the two cities of Tacoma and Seattle (or perhaps Seattle and Tacoma), and is the only great national park where the residents of large cities can spend their Sundays picnicking. It would appear, therefore, to be politically expedient to do something really worth while in this Park if for no other reason than that such action would undoubtedly develop considerable vote-getting propensities. Perhaps, if the lovers of nature could get the national parks into the Rivers and Harbors Bill, the long-practised custom of over-appropriation in that branch of our Federal Government might be made to apply to our scenic areas. But possibly the knowledge that this peak, which was once so well loved by the Indians, has been thoroughly taken away from them, has caused the interest of those in power to be diverted to other districts where the Indians still have a hold, at least in their minds, upon their small remaining territory.

NISQUALLY GLACIER AND RIVER

From this point is to be seen one of the most impressive views in the Park. The stream in the narrow valley is well filled all the year round and the glacier in the distance moves at the rate of sixteen inches a day.

The Indians in this district held Mount Rainier or Tacoma, as they called it, in reverential awe, in fact, one author has written a book upon the subject entitled " The

Mountain that was God." Why he should have used the past tense is not clearly understood, for if ever a country and people were dominated and inspired by a God-like spectacle, the people of the vicinity of Mount Rainier are held to-day in that dominion. That the Indians in past days worshipped at the shrine of this glorious spectacle in their simple obvious manner is no indication that none of us holds in his breast an equally reverential love of this mountain which once was and still is God of our peaks.

There is a theory that seems to be more or less founded upon observation and facts to the effect that man's mental development is largely influenced by what he sees, that the constant intrusion upon one's sense of the tawdry will in time bring down the standard of intellect and character, and that repeated contemplation of an inspiring view will in time lift the character to the levels above normal. Whether or not this is true to any great extent, there is little doubt that constant, intimate association with the beautiful undoubtedly influences character for the better. In the light of this theory, it is difficult for some of us who do not thoroughly understand the nature of the Japanese to appreciate the fact that Fujiyama, that most glorious of peaks, has largely influenced and moulded the character of the people of Japan. Nevertheless, it is my opinion, and the belief of others, that a certain element of sublimity of nature and sturdiness of character, which we know the Japanese possess, may be traced to their intimate knowledge of the beautiful scenery of their Island and their relationship with the "holy mountain." This being the case, the citizens in the vicinity of Mount Rainier should deem themselves most blessed, for they may raise their children at the very base of one of the most beautiful, impressive and inspiring mountains that can be seen on earth.

A TOWERING PEAK

Rugged scenery is one of the features of Mount Rainier National Park, and this view is one of many which keep the observer interested for hours at a time.

The glaciers on Mount Rainier are quite different from those to be found in Glacier National Park. In the former case they are actual active glaciers or rivers of flowing ice, as all true exponents of literary phraseology love to call them. The glaciers on Rainier are performing their age-old process of sculpturing the great stone mountain into shapes that will, in future generations, present puzzles to geologists. In fact, the Nisqually Glacier is said to move about sixteen inches a day, cutting and scouring the bottom of its channel with the great boulders that are embedded in its bottom like diamonds in the face of a drill. All the great glaciers of Mount Rainier are flowing quite rapidly. On the other hand, the glaciers of Glacier National Park are largely dormant. The large proportion of them are moving to some extent but they are not actively engaged in the real work of glaciers. They seem to be exhausted and in the last stages of their activities. Some of them are just huge cakes of ice which are, by comparison, mere bits of frozen residue from great glaciers that were, hundreds of centuries ago, perhaps a thousand times greater in size. They rest quietly in the cup of their great beds that were carved from the living rock in the days of their youth.

It is difficult for those uninitiated into the mysteries of glacial action and geological formations to appreciate how a cake of ice can cut a canyon a thousand feet deep. But it is their huge weight and slow movement which accomplish the end, and when it is realized that the ice of the Nisqually Glacier alone is more than one thousand feet thick in some places, the tremendous pressure that it exerts can be partially appreciated.

The streams from active glaciers are colored with a slightly milky hue. The infinitesimally fine particles that are the product of glacial scouring are held in suspension or solution within the waters so that, after becoming familiar with the appearance of glacier water, one may invariably recognize the flow from beneath an active glacier. This does not in any way contaminate the water or make it unfit for domestic use, as seems to be the opinion of most tourists who see that for the first time.

There is a fascination, which is not born only of the danger involved, in climbing these great ice fields. As a result many people who are physically and otherwise not qualified to essay the exceedingly exhausting ascent to Mount Rainier do so with the tourist's usual

indifference to the good advice of Government officials. As a matter of fact there is but one route over which the ascent to the summit of Mount Rainier is possible, and should one, fired with the valor of ignorance, attempt to find another and lose his way there is no hope of getting out. To many, the loss of lives of those who do not use

A STUDY IN BLACK AND WHITE

Against the almost black of the heavily wooded slope in the middle distance the snow-clad range in the background makes a striking contrast.

their intelligence in such cases, by taking the advice of officials, is a matter of no moment, but to the Government the fact that several lives have been lost to venturesome but inexperienced climbers is a matter of seriousness. The danger of climbing Mount Rainier does not lurk only in the problem of mountaineering, but also in the weather conditions. At an altitude of from 10,000 to 14,000 feet the wind storms and snow storms are not tempered to the "shorn lamb" and it is not unusual to find a stretch of several days when the ascent to the peak would be utterly impossible. Should a mountaineer be caught in some of the heavy snow storms there would be no possible opportunity of coming out alive, and if he were to encounter one of the fierce wind storms no form of footing could save him from being blown into a crevasse.

Of all the parks in our system, Rainier is certainly deserving of further development. Its proximity to a large population, its tremendous interest as the only immediately accessible system of glaciers in the United States, its marvellous beauty and inspiring dignity and its many lakes and fields of wild flowers would justify an expenditure many, many times as great as the appropriation allotted. In a park of 207,360 acres, the area of which does not include anything but the cream of scenery, the Federal Government has built a mere snip of a few miles of road which barely reaches the snout of one glacier. It has built a few trails leading to other parts and has done nothing else.

What is needed is an encircling road that shall pass entirely around the Mountain on practical grade. From this encircling road should be constructed entrance roads from each of the corners so that one might enter on any side of the park, strike the encircling road, swing around it as far as desired and exit at another side. From this encircling road should be built trails and small spur roads to such interesting spots as Spray Park, Reflection Lakes, and other specially attractive locations. Whether this will ever be done or not is difficult to determine. It is certain, however, that if Mount Rainier were a possession of any of the European countries it would be developed to its maximum in a very short time, for the people of Europe have learned that scenery is a national resource as much as coal and timber and that it can be sold over and over again without a reduction in the original bulk of the commodity.

MEMORIAL TABLET FOR GEORGE W. VANDERBILT

IN acquiring the tract of rough mountain land known as Pisgah Forest, adjacent to his estate at Biltmore, North Carolina, and in placing the management of this area in the hands of a professional forester as early as 1897, Mr. George W. Vanderbilt became a pioneer in the encouragement of national forest management of private lands in this country. Through the opportunity thus offered, Gifford Pinchot, and later Dr. C. A. Schenck, conducted numerous instructive operations. The inspiration of this work undoubtedly was most instrumental in launching the campaign for national forests in the Appalachians. From small beginnings great movements spring.

Following Mr. Vanderbilt's death, the tract was offered by Mrs. Vanderbilt to the government and was purchased at $5.00 per acre. The acreage was 80,398 acres. This purchase was subject to a timber contract which runs for 20 years, under which the mature timber, measuring over 18 inches at the ground, may be cut and removed.

In recognition of his great and lasting service to forestry in this region, the Southern Forestry Congress, held at Asheville recently, voted to erect a memorial tablet to Mr. Vanderbilt at the entrance to Pisgah Forest. A committee was appointed to raise the necessary funds, the members of which are Governor Locke Craig, Raleigh, N. C.; Dr. Joseph Hyde Pratt, Chapel Hill, N. C.; Dr. W. H. Holmes, Smithsonian Institution, Washington, D. C.; Charles Lathrop Pack, Lakewood, N. J.; Henry S. Graves, U. S. Forest Service, Washington, D. C.; George F. Kunz, president, American Scenic and Historic Preservation Society, New York City, and George S Powell, secretary of the Appalachian Park Association, Asheville, N. C.

The Bird Department

By A. A. Allen, Ph.D.

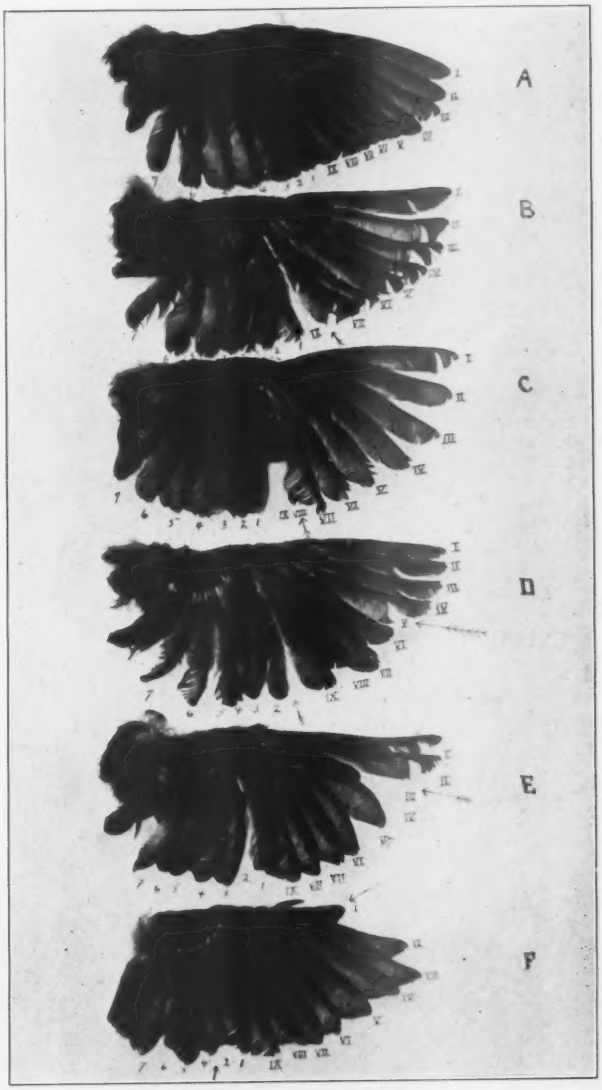
Assistant Professor of Ornithology, Cornell University, Ithaca, N. Y.

AUTUMN BIRDS AND THEIR MESSAGE

NO phenomenon of nature is more striking to the observant watcher as he enters the September woods than the change that has been wrought in the realm of birds. The hundreds of shrill voices that claimed his attention during spring and summer are now hushed and he hears only the occasional notes of a red-eyed vireo or a wood pewee. So quiet are the tree-tops and so silent the forest floor that he is almost ready to believe that the birds are gone, but, as he traces the border of the woods further, he suddenly finds himself in the midst of a flock of birds even more numerous than the hosts of spring. They are scratching in the leaves, shaking the bushes and weeds and chippering in the tree-tops in such manner as to announce their presence beyond any doubt, although they be difficult or even impossible to see.

In the fall the birds are no longer scattered evenly through the woods and fields but have gathered in flocks, sometimes many species together, and are moving slowly southward. Where food is abundant they stop for some time, but they shun all places where food and water are scarce. In spite of their numbers, however, they are difficult to see among autumn greens and browns, for the familiar liveries of spring have been discarded for suitable travelling attire. Little change has come over the sparrows and vireos, whose dull plumages serve for both summer and winter, but the bright tanagers, buntings and warblers have now assumed the modest dress of the females and even the robin has his red breast tinged with gray. Let us see, then, what has been happening during the past few weeks to work these remarkable transformations.

August is the month of molting, the season when birds change their faded, worn plumage for fresh feathers, often of a different color. The process, however, is such a gradual one that, although every feather is shed and replaced, one scarcely knows that it is taking place unless there is a change in color as well. Beginning always at a definite feather, usually the innermost primary wing feather, the molt proceeds with regular sequence until all the feathers are replaced. The second feather is not lost until the first is partially grown, and, before the third and fourth are lost, the first is practically matured. The same is true of the tail feathers, so that a bird is never without the use of its locomotor organs and steering gear. An exception to this rule is found in the ducks and diving birds which are not dependent upon their wings to escape their enemies and which, therefore, can safely molt all of their primaries at the same time and be temporarily deprived of the power of flight. On the bird's body, likewise, the molt proceeds gradually from a definite point, only a few feathers being lost at a time. The half-naked chickens seen in many farm yards are examples of arrested feather development which does not occur in nature except in cases of disease. As almost everyone knows, feathers are not born indiscriminately over a bird's body but along definite lines called feather



A SERIES OF MOLTING SPARROWS' WINGS

Showing the way in which the feathers are replaced, beginning with the innermost primary (IX) and working gradually each way. Roman numerals indicate primaries, arabic, secondaries. The arrows indicate the progress of the molt.

tracts. Between the feather tracts, which are apparently regular in every species of bird, there are extensive bare areas which are dependent upon the overlapping of the feathers of adjacent tracts for protection. In the young of most birds, until the feathers are matured, the feather tracts (pterylæ) and the naked spaces (apteria) are very conspicuous. The sickly chickens appear so naked because the bare spaces are entirely exposed by the scarcity of feathers in every tract.

A MOLTING SPARROW

Showing the replacement of feathers. The new feathers appear darker than the old and include all but three of the primaries, one secondary, the wing coverts and a few feathers on the back. Several of the central tail feathers have been lost but not yet replaced.

Most birds molt but once a year, but it would obviously be impossible for a bird that changes to a dull coat after the nesting season to assume its brilliant breeding plumage without another molt in the spring. Thus we find in the case of the scarlet tanager, goldfinch, bobolink and other brilliantly colored species that the males undergo a spring or "pre-nuptial" molt as well as a fall or "post-nuptial" change of plumage. The pre-nuptial molt is usually incomplete, however, as the wings and tail feathers, which are dull even in brightly colored birds, are made to serve both plumages.

In some birds, however, where there is a conspicuous change in color from the winter to the breeding plumage, it is accomplished in another way known as "feather wear." This is possible because each feather is tipped with a color different from the main portion of the plume. The feather tips give the general color to the fall and winter plumage, but as they wear off, the underlying breeding color is exposed. Browns, yellows and grays occur most frequently as color-tips with blacks, browns or reds beneath. The robin's breast becomes much redder with the advance of spring because the gray tips of the feathers wear off. The black spot on the throat of the house-sparrow and that on the breast of the meadowlark treble in size. The red-winged blackbird loses his reddish-brown cast and becomes intensely black, while the snow bunting wears away the dusky from its head and breast and shows snowy white.

In birds like the purple finch and indigo bunting, where there are no apparent gray tips to the feathers and which still seem to become more intensely colored as the season advances, the feather wear is of a different sort. It was formerly believed that the feathers became repigmented from the blood of the bird but to-day that is considered impossible, because once the feather is mature, it is a dead structure, physiologically disconnected from the bird's body and serving only in a mechanical way for flight and protection. To understand what actually happens in the case of these birds, it is necessary to know something of the structure of a feather as shown under the lens.

All feathers are composed of a mid-vein or shaft and the web. If the web is examined carefully it will be seen

A PAIR OF HOUSE SPARROWS

These birds are in their summer plumage. The sparrow has no spring molt, but by the wearing away of the gray tips of the feathers a considerable change in color ensues, especially on the throat of the male.

to be composed of a series of fibers called "barbs" attached on each side of the shaft. Each barb, similarly, bears rows of small barbules. When these barbules are examined under the microscope they are found to bear a number of minute recurved hooklets which fasten into the hooklets of adjacent barbules and give to the feather its firmness, being best developed in the wing feathers, which require the greatest strength. Some feathers and the innermost parts of most feathers lack this device and are therefore always soft and fluffy, giving little resistance to the passage of air through them. Now in the case of the purple finch and indigo bunting, the red and the blue colors are located mostly in the barbs while the barbules and hooklets are dusky. With the wearing away of the hooks and the barbules on the body feathers, the barbs become more conspicuous and the color of the bird becomes apparently more intense.

That molting is not confined to birds is well recognized and its homology to the " shedding of the skin " in reptiles and amphibians is conceded. Of course, the snake or the salamander does not actually shed its skin but merely the hard outer cuticle. This cuticle, as in the case of the birds' feathers, when fully formed is a dead structure and it is inelastic. Consequently, as the snake or salamander grows, this " shell " becomes too small for it and must be replaced by a larger one. The more food one of these cold-blooded animals consumes, the more rapidly it grows and the more often it has to molt. It is not seriously discommoded by the process, however, except for a short time when the loosened cuticle over the eye becomes opaque and renders it nearly blind. When this occurs the animal rubs its nose against a stone, splitting the hard cuticle and then gradually wiggles itself free, leaving the skin entire, a sort of a ghost of its former self.

With birds the molting is a more serious matter. It

ANOTHER PAIR OF HOUSE SPARROWS

These birds are now in their winter plumage. The black spot on the throat of the male is largely concealed by the gray tips of the feathers.

requires far more energy to grow a new set of feathers than merely to form a new cuticle, in fact, so much so that most of the other activities must stop and the bird's entire strength be given to molting. As a result song ceases, fighting and display are never indulged in, and nesting activities are completed and out of the way. The birds retire to the thickets and move about only in search of food. It is a period of sickness or indisposition and the birds shun each other's company. During the molting time many birds practically disappear and are nowhere to be seen for several weeks. The red-winged blackbirds, for example, are very abundant in all the marshes until the last of August. Each evening they can be seen flying in large flocks to roost in the marshes and each morning leaving again to feed on the upland fields. The sexes separate in flocks by themselves and show little interest in each other. Suddenly the male birds disappear, shortly the females follow and there ensues a period of several weeks when no blackbirds are seen either morning or evening, nor are they to be seen during the day about the marshes. In a few weeks they appear again and this time in even larger numbers than before, for they have been

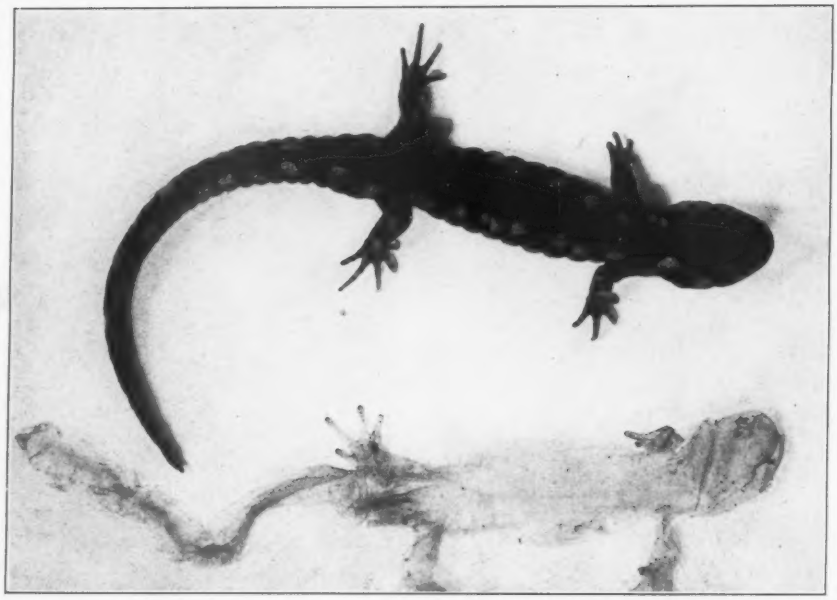
A YOUNG GREEN HERON

Showing the feather tracts and naked areas between found in all birds. The bare areas are later entirely concealed by the overlapping of the feathers of adjacent tracts.

joined by migrating birds from the north. In former years it was supposed that the early disappearance was caused by the resident birds leaving for the south and that the reappearance of blackbirds announced the arrival of birds from the north, but the unaccountable part of the story was that although the August birds were supposed to be leaving for the south, they never arrived. Instead, the blackbirds in the south likewise disappeared and were supposed to be moving eastward to the rice fields. The mystery of their disappearance, however, can easily be explained by anyone who will venture out into the heart of the larger marshes during the first of September, for there he will find, after sufficient search, large flocks of short-winged, short-tailed blackbirds skulking about the more open areas and hesitating to fly far. For it is at this period that they are just completing their molts by the

replacement of the outer primary wing feathers, the loss of which, in shortening the wing, makes flight difficult and the long trips to and from the uplands practically impossible. Hence they are seldom seen and it might easily be thought that they had left for other parts.

Thus it is with other birds also. They cease singing and go into hiding until the molting is practically completed, but it is not long before they regain their former vitality and some even revive their full springtime songs. The majority, however, prefer to rest after their strenuous labors, filling their crops with fruits and seeds and laying up a storage of fat that will serve them in the long journeys that they are about to undertake.



A SPOTTED SALAMANDER

Note its molted skin. Snakes and salamanders molt the cuticle entire by splitting it at the nose and wiggling out. They molt at irregular intervals, dependent largely upon the food supply. Birds, on the other hand, molt at a fixed time, once or twice a year, losing but a few feathers at a time and replacing them as fast as they are lost.

The Larks

ALTHOUGH over 225 members of the lark family, including species and sub-species, have been described, there is but one species, the horned lark, found in North America, all others being found in Europe, Central Asia and the plains of Africa. The North American bird is widely distributed from ocean to ocean and from Mexico to Alaska, but is most abundant in the Mississippi Valley. It is a permanent resident wherever found, except in the northern part of its range, and its non-migratory habits and general adaptability have brought about a great deal of variation in the birds living in different parts of the country, as many as 20 geographic races having been recognized. The bird, for example, found along the Atlantic coast in winter and nesting in Labrador and Hudson Bay region is the common horned lark or shorelark; the bird of interior New England, New York and the Mississippi Valley is the prairie horned lark, while further west we find the pallid, the desert, the ruddy, the scorched and the dusky-horned larks. All, however, are so similar as to be indistinguishable except by a specialist.

Although the horned lark is the only native species of lark, the European skylark has been introduced into Oregon and Long Island and while not multiplying very rapidly, it still holds its own and sings with all the fervor of its European brothers. The meadowlark, which is even more abundant than the horned larks, belongs to the blackbird family (Icteridæ) and will not be considered at this time.

Larks, in general, are sparrowlike birds but with smaller, rounded bills, rounded tarsi and greatly elongated hind toe-nails. The American horned larks are easily

A PRAIRIE HORNED LARK

Showing the characteristic black markings about the face. Larks are permanent residents in all except the most northern parts of their range and are found throughout North America.

distinguished from any of the sparrows by the curious black markings about the face and the little tufts of erectile black feathers on the head. They frequent open

farming country and prairie land, travelling in flocks except when nesting, and having sociable, unsuspicious natures, so that one may often approach very close to them. They often run along ahead of one in the road until pressed too closely, when they mount into the air with cheerful whistles.

The horned larks begin to nest very early in the spring and often the nests are overtaken by late snows, as shown in the illustration. The nest itself is placed in a depression in the sod with no protection whatsoever, but the olive or grayish speckled eggs are, nevertheless, quite inconspicuous even when left uncovered.

NEST OF THE HORNED LARK
Built during early March and overtaken by a late fall of snow. The bird was flushed from the nest by the photographer.

During the breeding season the males perform aerial evolutions which quite equal those of the skylark in daring if not in melody. Mounting upwards on a great spiral, the bird ascends until nearly lost to view. Then poising for a few moments and breaking into song, it undertakes a thrilling dive toward the earth, closing its wings and dropping like a plummet, threatening to dash itself to pieces, but finally, when within four or five feet of the earth, it catches itself, swerves and very gracefully alights.

Except during the nesting season, the food of the horned lark is largely the seeds of weeds, only twenty per cent being composed of insects. In some localities, especially in California, complaints have been made against them because their fondness for seeds has taken them into the newly planted fields and they have consumed large quantities of seed wheat. In these places the wheat is sown broadcast and it naturally attracts many birds, such as the mourning dove, meadowlark and blackbirds, as well as the horned larks, and undoubtedly considerable damage is done. It can easily be averted, however, by drilling the wheat, and certainly it is a most near-sighted policy that allows these birds to be shot or poisoned when their services in destroying insects and weeds are so much needed. For during the nesting season over forty per cent of their food consists of grasshoppers, white grubs, cutworms, weevils, chinch bugs, etc., while nestlings are fed almost entirely upon insects. And at other times of the year, though the numbers of insects destroyed be smaller, they are of great value in consuming such obnoxious weeds as fox-tail and crab-grass, amaranthus, pigweed, bur-clover and corn-cockle, the seeds of which are a very important item in their food.

In former years, especially in California, larks were shot and poisoned about the grain fields or netted for the markets of the larger cities, where they were sold as "reed birds," but to-day, because of a better understanding of their economic value, they are deservedly protected by law.

NATIONAL FOREST RECEIPTS

RECEIPTS from national forests for the fiscal year 1916 reached the high-water mark of approximately $2,820,000, according to figures just compiled. This is $341,000 above the 1915 total, which in turn exceeded any previous year. Officials say that the gain was due to increased demand for all classes of forest products.

There was a decided growth in the revenue from all sources, the largest being that of $203,000 in timber sales. Grazing fees showed a gain of $77,000. Receipts for water-power development were over $12,000 more than for 1915. Sales of turpentine privileges and charges for special uses were both considerably in excess of the previous year.

WESTERN FORESTRY MEETING

THE annual "forest industry conference" of the Western Forestry and Conservation Association and the annual Pacific Logging Congress will be held jointly again this year, in Portland, October 24 to 27. These are the two largest gatherings of Pacific coast forest interests, being attended by lumbermen, state and government officials and railroad representatives from the five western timbered states from Montana to California and from western Canada. Prior to 1915 they were held separately, but a joint session in San Francisco during the fair proved the advantage of a single occasion when the attendance is so largely identical.

October 24 will be devoted to protective problems and October 25 to matters of general lumber interest, including such topics as the Government's lumber study, Canadian lumber affairs, foreign trade, and better correlation of organized effort to improve the industry. Representatives of the Federal Trade Commission, the Forest Service, the Department of Commerce and the National Lumber Manufacturers' Association will be present. October 26 and 27 the Pacific Logging Congress will be in session to discuss improvements in logging practice, leaving the last evening by special train to spend October 28 in the Crays' Harbor camps to see field demonstration.

The Appalachian Forest Purchases

By Hon. John W. Weeks

U. S. Senator from Massachusetts

PERHAPS I cannot do better in speaking about forest conservation than to call attention to the work of the National Forest Reservation Commission which has had charge of the purchases made in the White Mountain and Appalachian regions under what is known as the Weeks Act. The original appropriation for this purpose amounted to eleven million dollars, to be expended during the six years following the passage of the act; but the Commission followed such a prudent and careful course that it was not possible to organize sufficiently to take up the examination and purchase of lands during the first two years of the life of the appropriation. For that reason three million dollars of the appropriation lapsed and only eight millions, or substantially that amount, has been expended up to this time.

Photo by Henry Havelock Pierce, Boston, Mass.

HON. JOHN W. WEEKS
United States Senator from Massachusetts and Vice-president of the American Forestry Association.

Senator Gallinger, of New Hampshire, who is a member of the Commission, recently offered an amendment to the Agricultural Appropriation Bill providing a million dollars to be expended in continuing these forest purchases during the fiscal year ending the thirtieth of next June and two million for the fiscal year ending the thirtieth of June, 1918. This measure passed on August 5th. This is really a reappropriation and is one of the most commendable actions taken in forestry matters since the passage of the original law.

Having followed with some care the work of this Commission from the financial standpoint, it is my impression that the purchases made have been entirely justified and that, as in the case of the State of New York, the Government will eventually reap a very substantial profit if it wishes to dispose of the lands, and if the timber is carefully cut that there will be for all time a substantial return on the original investment.

In addition to this work, the provisions in the original law for the protection of forests from fire have, in my judgment, saved timber having a value of many times the cost of the service; in fact, one of the greatest advances made in recent years has been the effectiveness of the fire service, coöperated in by the States in the East and conducted by the Forest Service in the Rocky Mountain sections. While there is no way to compute the actual results in dollars and cents, based on the destruction from fires in years past, it is safe to say that the saving from this one service has been greater than the whole expenditure for the Forest Service since its establishment.

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Ornamental and Shade Trees

A Department for the Advice and Instruction of Members of the American Forestry Association

EDITED BY J. J. LEVISON, B.A., M.F.

SELECTING TREES FOR PLANTING

WHILE spring is the time for *planting*, the preparations for planting should commence in the fall. Fall is the time to purchase trees and leave them standing labelled in the nursery for spring delivery. Holes in the sidewalk about five feet long, three feet wide and three feet deep may be opened in the fall and the ashes, tin cans and bottles frequently composing a street soil may be changed for two cubic yards of rich black loam.

In selecting the trees for street planting, consideration should be given not only to the species but to the *specimen* as well. The specimen tree should be about 2½ inches in diameter, should possess a straight trunk, a definite leader and a symmetrical crown, commencing at seven to nine feet from the ground. It is sometimes difficult to find trees that will, in every respect, meet these specifications and it might then be well to agree to a smaller diameter, but to insist on well-formed specimens. Individual perfection, symmetry and uniformity are fundamental principles in successful street planting. For this reason, it is important to plant trees of the same species on the same street or at least on a stretch of several blocks; to have all trees of uniform size and to set them out at equal distances apart. Thirty feet apart is a suitable distance for most street trees and a tree like the elm should be allowed sixty feet. It is in the realization of just such points wherein lie the advantages in having a municipality undertake such work. If left to the citizens to do this individually, the trees will be planted either too close or too far apart. Many species will be mixed on the same block and many blocks will have no trees at all.

As to the *selection of the species*, that will, of course, vary with the region and local conditions. In a general way, however, persons in the East will find the *oriental sycamore* the hardiest of all for street planting. The sycamore has lately been slightly afflicted with a leaf blight (gloeosporeum nervisequum), but the disease has not become general enough to do serious damage. The *Norway maple* is another tree equally desirable. The oaks, though of slower growth at first, are by far the noblest and most long-lived trees. The *red, pin* and *scarlet oaks* are the three best species for street purposes. The red oak is the fastest growing and least fastidious in its soil and moisture requirements. The pin oak is most beautiful when its low pendulous branches are disturbed as little as possible and when its roots can get plenty of moisture. The tree is therefore best adapted for suburban sections. The scarlet oak is worth the trial for its persistent and brilliant foliage. The *Ginkgo* has demonstrated its adaptability to poor soils, to unfavorable city conditions and its resistance to insects and disease. It should be tried to a greater extent for street planting than it generally is. The *English elm* is another tree doing well in many large cities.

There are a number of trees that are planted for their admirable qualities of either form, color or beauty of their flowers, but, requiring special favorable conditions and care, they should be chosen with a greater degree of hesitancy than the above and planted preferably in the suburban sections rather than in the heart of the city. The principal of these are the sugar and red maple, European linden, horse-chestnut, American elm and tulip tree.

The *sugar maple* has a symmetrical form and combines many shades of color in the fall, but requires plenty of moisture. In the vicinity of New York City, the trees of this species planted in the heart of the city are rapidly dying off and there is no other cause attributable for this condition except the excessive evaporation from the leaves against the meagre quantity of moisture taken in by the roots from the impoverished street soil.

A WELL PLANTED STREET

Here are two fine rows of Norway maples which, with a few years' growth, will give a bountiful shade. The street is in Brooklyn, where expert attention is given to street tree planting.

The *red maple* and the *linden* are both moisture-lov-

ing trees and the latter is a favorite food for insect pests. The *European linden* is the better tree for street planting. The *American linden* grows very straggley in the vicinity of New York, though it seems to do better further south. The *horse-chestnut* prefers a rich soil and is subject to a fungous disease, which discolors its leaves, causing them to drop in midsummer. It is also a common victim of

PROTECTING THE MAPLE

In the centre is a small but hardy Norway maple and upon each side are poplars of larger growth which have been placed there temporarily.

" slime flux," a disease that causes the flow of sap from crevices in the trunk. The tree is used extensively abroad for street planting, but, for reasons just stated, should be used more sparingly in this country. The *elm* has the noblest form of all our shade trees, but should only be planted on wide avenues, in suburban sections where it can find a deep, rich, moist soil and plenty of unvitiated air. The tulip tree compares favorably with other species in form and attractiveness, but it is so exacting in its soil and moisture requirements that only young specimens should be used and its planting restricted to suburban sections.

The *objectionable* trees for street planting are all the *poplars,* the *silver* and *sycamore maples,* the *catalpa* and *male ailanthus*. The poplars are very short-lived trees. They are dangerous in wind-storms and grow so fast as to require constant cutting back. At a certain age their roots upset the sidewalk and their fine rootlets clog the neighboring water and sewer pipes. Their leaves drop very early in the fall and if the species is of the pistillate kind, the catkins, falling on the sidewalk, become a danger and a nuisance to pedestrians. The silver maples are constantly full of dead wood, are subject to boring insects and are short-lived. The sycamore maple is a favorite of boring insects in the vicinity of New York, though in other places it has escaped these pests. The variety of ailanthus tree that bears the male or staminate flowers generates a strong, rather oppressive odor, but if the pistillate form is chosen, the tree will produce a beautiful head and grow in places where no other tree will grow.

Such are the principal problems of those charged with the care of street trees. I have not attempted to dilate on the details of the work because they are too numerous and because, as in everything else, their solution will often depend more upon the judgment of the forester in charge and upon the local conditions than upon any rules that may be laid down. But, whatever the problems, do not let us forget that they can always best be solved by one equipped with technical knowledge and experience, and that the trees are worth the effort since they are always valued by the citizen and ultimately lead to a better appreciation of all other forms of civic improvement.

MOVING LARGE TREES

SUPERINTENDENT C. L. BROCK, of the Park Department of Houston, Texas, sends the accompanying photographs of some trees that he moved recently with successful results. Main Street of Houston is being widened into a wide boulevard and it was necessary to set back many of the trees to make room for

MOVING LARGE TREES

Each tree, most of them large ones, on a line along which stands the tree in this photograph, was moved close to the wall on the left, at Houston, Texas. Out of 215 so moved, only three died.

the pavement. In all, there were two hundred and fifteen trees to be moved. These are live oak (*Quercus Virginiana*), as no other trees are planted on the street. Most of the trees were moved from three to fifteen feet and a few, fifty and sixty feet.

Considering the time of the year,—the moving was in June and July,—it was a somewhat hazardous task

BALL OF EARTH ON TREE BEING MOVED

In moving trees to widen a boulevard at Houston, Texas, particular care was taken to keep each in as large a ball of earth as possible, and, as a result, the transfer was most successful.

to move them, but to date only three have died from the effects.

Many of the trees are putting out sprouts and with plenty of water should live and do well. A ball of earth weighing from two to ten tons was moved with each tree.

NEWS ITEMS

A special meeting of the American Academy of Arborists was held recently at the Zoological Park, New York City. The meeting was full of interest and enthusiasm, with plenty of field observation and discussions of recent important problems in arboriculture. Papers were presented by Messrs. Maxwell, Smith and Robson, and a very profitable trip was taken along the Bronx Parkway which is now in course of construction. Mr. Merkel, chief forester and designer of the parkway, surprised the members with the enormous and intricate problems of the undertaking. The next annual meeting will be held in August, 1917, at Washington, D. C.

ADVICE FOR SEPTEMBER

1. Prune all dead branches of importance. Do not prune unnecessarily; prune as little of the live wood as possible; make all cuts close to the trunk or main limb and cover all wounds with coal tar.

2. Remove and destroy egg-masses of the tussock moth and similar leaf-eating insects.

3. Mark for removal in winter, all hopelessly infested and dead trees. You can discern these trees with greater definiteness before the leaves drop, but you can cut them down to greatest advantage in winter.

4. Plant evergreens during the latter part of August and early September. Move them with a ball of soil.

QUESTIONS AND ANSWERS

Q. Is there anything further to be done for five clumps of apparently thriving pin-oak forest trees, in a Jersey suburb? The soil is clay. Shall be glad of any suggestions.

H. W. C., *Montclair, N. J.*

A. Pin oaks will readily respond to heavy fertilization with well-rotted manure and leaf mold. You will do them a lot of good if you will, in November, dig in some of this fertilizer, and, in the meantime, see that all old wounds are freed from decayed wood and properly covered with coal tar.

Q. Can you advise me as to what trees to plant on a piece of ground—67 acres—I have just bought with the object of making a summer home. We are located in central West Virginia and the land is all sloping hillsides, sandy soil. I want some quick growing trees for near the house and some ornamental and nut trees. Would oriental sycamores be good for this location for quick growing shade?

C. C. J., *Clarksburg, W. Va.*

A. Oriental sycamore trees are very desirable for your purpose, around the house. The American and European lindens, the red and pin oaks, the Ginkgo, sweet gum and tulip tree are a few others of the shade trees. The English walnut, pecan and "Sober Paragon" chestnut will be suitable for nut trees, and the white pine and hemlock for groves of evergreens.

Q. The honey bees have been attacking my catalpa trees severely. They seem to get on the main part of the leaf and suck all the sap out of the leaf till it falls to the ground. Can you tell me what to do?

M. A. C., *Cranford, N. J.*

A. We have never heard of honey bees doing what you say, but there is a little green fly which, during the month of July, feeds on the under side of catalpa and Norway maple leaves, causing them to drop prematurely. These flies produce a glossy, sticky honey-dew, and perhaps you have that in mind. Spraying the affected leaves with whale-oil soap, one pound to ten gallons of water, will destroy the insects.

Q. On my camp, here in the Adirondacks, I have a very fine white birch, which, about ten feet up on the trunk, has a large open break. I believe such trees can be doctored. Can you kindly refer me to a place where I can get the stuff which is put into such trees?

J. C. F., *Long Lake, N. Y.*

A. I am sorry to hear of the condition of your white birch. It seems to me that the first thing to do would be to secure the break at its upper and lower ends by bolts. The bolts should be provided with nuts and washers embedded in a groove under the bark. When the split is thus bolted, it may be left open, and so cut that the water will drain off. The interior of the break should be thoroughly covered with creosote and tar in mixture. A filling of cement will then not be necessary and an "open wound" will serve the purpose better. If you prefer to close it, however, ordinary stone or brick in mixture would answer for this purpose. I enclose a little leaflet which will give you full instructions.

Q. On a pink horse-chestnut tree, seven feet high, planted two years ago, the leaves suddenly turned brown and the fourth day fell off the tree. I sent for the horticultural expert, who dug to the root, found it mildewed and partly rotted, lifted up the tree and threw it away. An oriental plane tree nearby, nine feet high, showed the same condition, was pulled up and thrown away; the plane tree had not properly leaved out. Could not these trees have been treated and saved?

H. J. W., *Los Angeles, Calif.*

A. It is a little hard to tell, without seeing the specimens, whether those trees really had no more chance for life, or whether their buds were still intact and capable of development. Perhaps the roots, as a result of poor planting, stagnant water or

sewerage, were so badly injured that your advisor considered them useless and therefore impossible to be treated. It is generally wise in such matters to determine the exact cause or to send a specimen from the tree in to us for examination. In case of doubt it is generally a good plan to cut the branches in a bit and give the tree another chance.

Q. When is the best time to plant poplar trees, what kind shall I plant, and how shall I plant them?

F. J., *Scarsdale, N. Y.*

A. The best time to plant poplar trees is early spring, though it may also be done in the fall.

The species to choose must depend upon the purpose. The Carolina poplar is best of the poplars where shade is desired. The Lombardy poplar is best suited for æsthetic and avenue effect.

The principal thing to remember in planting poplars is to cut them back hard. They will then thicken out better and grow more vigorously. In other respects the planting of poplars is the same as that of other species.

Q. What is the "cedar apple" and what does it do?

M. J. K., *Freehold, N. J.*

A. The cedar apple is a fungous growth appearing early in the spring in the form of a brown, apple-like growth on red cedar trees. It uses the cedar trees as temporary hosts for the winter, but really does its damage as a fungous blight on neighboring apple trees and hawthornes.

Q. When shall I spray my red cedars for red spider and with what?

H. H., *Philadelphia, Pa.*

A. Spray in early May but also examine the trees during June and July and spray them if you find it necessary.

Use whale-oil or fish-oil soap at the rate of one pound to ten gallons of water.

Q. Where will rhododendrons and laurel grow best?

J. B., *Brooklyn, N. Y.*

A. Under the shade of other trees and in rich, deep soil.

Q. Do you know of any machine used in the nursery trade for the counting and tying of trees?

D. H., *Dundee, Ill.*

A. We do not know of any such machine.

WHO PLANTS A TREE

JOHN GREENLEAF WHITTIER'S poem for the agricultural exhibition at Amesbury contained this verse:

Give fools their gold, and knaves their power;
Let fortune's bubbles rise and fall;
Who sows a field, or trains a flower,
Or plants a tree, is more than all.

More men are planting trees. With clearer vision, large wealth is finding services that look to the long future and the common good. A country boy loved a big hill near his home. He went forth and made a fortune. He has bought the hill and on its slopes he has planted 50,000 trees and shrubs. Thousands visit it.

Less than fifty miles away a man is planting forty acres in trees a year; so far he has planted 320 acres; he is beautifying a mountain-side. He came from a family of foresters in Germany; love of trees was born in him, and this is his tribute and his token to America, which has made him rich. A score or more of individual forestry operations are in progress.

Where is the personal return? A case will give the answer: Seventy years ago a lover of trees did much planting on his fine estate on the outskirts of Baltimore. He brought new kinds from different parts of the earth. In 1860 he died and Baltimore bought the estate, and this became the renowned Druid Hill Park, whose tree beauty has been more written about and illustrated and praised than anything of the kind in America. What is the point? This: The name of the man who planted the trees is emphasized in local history. Other notabilities of his day are forgotten. He bought living fame by planting trees.

Often Wealth says: "I'll not wait. I want quick returns for my money." And he puts up a hotel and names it after himself, or a whale of a house in which he is lonesome. If Wealth is wise he says: "I'll put it where it will grow." And when he plants trees it grows into blessings.

Surely there is something noble and uplifting in the company of trees. And the good of it grows whether you plant a single tree or a mountain-side.—The Country Gentleman.

VERMONT FORESTRY MEETING

THE Twelfth Annual Meeting of the Vermont Forestry Association was held at Lyndon on Wednesday, August 2nd. In the forenoon an inspection was made of the State plantation of Scotch pine, which was made in 1912 on shifting sand. The experiments carried on here with sand binding grasses from Cape Cod and with open fence, such as was recommended by the Department of Agriculture, were of much interest to those present, as well as the planted growth of Scotch pine. Mr. Charles Darling, fire warden of Lyndon, entertained the members and their friends at dinner served at "The Old Brick Tea Shoppe," Lyndon Corner. Immediately following the dinner there was a meeting of forest fire wardens of Caledonia County, addressed by A. F. Hawes, state forester, and L. H. Bailey, entomologist. At 3 P.M. the Forestry Association held a coöperative meeting with the "Lyndon Home Project Club." Mrs. Chase, the originator of this Club, developed a very interesting program in which several boys of the locality gave short talks pertaining to forestry. Other speakers were Roderic Olzendam, secretary of the Association, and Amos J. Eaton, who closed his remarks with selections from Drummond's French-Canadian dialect poetry. In the evening there was a joint session of the Vermont Forestry Association and the Vermont Timberland Owners' Association, at which there were addresses by Hon. T. N. Vail, president of the American Telephone and Telegraph Company, Hon. H. F. Graham, state auditor, W. R. Brown, president of the New Hampshire Timberland Association, A. F. Hawes, state forester, and James P. Taylor, secretary of the Greater Vermont Association.

At the business meeting the following officers were elected: president, Ernest Hitchcock; vice-presidents, Theodore N. Vail, Redfield Proctor; secretary and treasurer, R. M. Olzendam; executive committee, Allen M. Fletcher, Frank Plumley, James Hartness, Amos J. Eaton and A. F. Hawes.

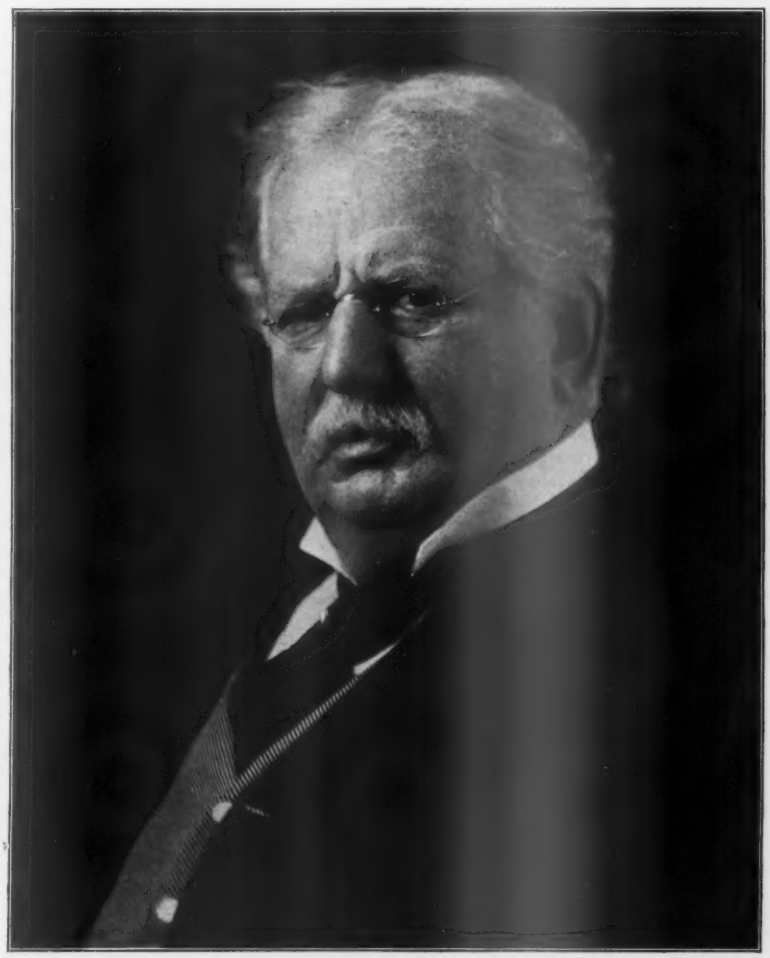
Conservation of Our Forests

Extracts from an address to the Vermont Forestry Association

By Theodore N. Vail

President, American Telephone and Telegraph Company, and Vice-President of the American Forestry Association

CONSERVATION has been much used and much abused in connection with our national resources. It is a big, open question how best to serve the present necessities of man and yet have proper consideration for future necessities. If you are thrifty, you conserve fruits and vegetables and other products for your future use, but you only conserve articles particularly intended for that purpose, or the surplus above your present needs. That is what should be the teaching of conservation—how to use without waste our natural resources for our present needs, and protect and conserve the rest for future use. When the present needs are in conflict with our real or conjectural future needs, we must decide in favor of the present demands, or those of the near future.



THEODORE N. VAIL

President of the American Telephone and Telegraph Company and Vice-President of the American Forestry Association.

Conservation, as applied to forestry, is a question of location or environment and local conditions. In Vermont it is not waste to burn up the small branches of the fallen trees; fuel is too plentiful and too cheap and labor too expensive to prepare them for use; yet, in some parts of the world it would be wanton waste not to save for use for domestic purposes every last stick and twig. It was not waste for our pioneer fathers to make a slash of the timbered sides of these Vermont hills and burn it to clear the land for agricultural purposes, because the wood encumbered the ground and was an obstruction to settlement; but now if you wanted to clear a piece of timber for cultivation or pasture, you would not do it that way. It is not waste or wanton destruction to clear woodland to the last stick, if you protect the new growth for future use. Our timberland must now be treated the same as any growing crop—planted or be allowed to plant itself, protected and harvested at maturity, and our shade trees must not be held too sacred to remove when they become a nuisance instead of a pleasure or a benefit.

Much is talked about conservation in connection with the freshets of spring and dwindling of our streams in summer. Many of the things which some think due to lack of conservation are the inevitable sequence of cultivation and settlement. Timberland cut over but not burned over, if the new growth is protected, or timberland of growing trees, will practically protect the streams as well as if the old timber was left standing. Uniform streams throughout the year never have existed, and to make them would require reservoirs to catch all above the average flow and to hold it to use as needed. The tangled, mossy, fibrous ground of the primeval wilderness and the valley swamps caused by fallen timber and luxuriant weed growth acted as reservoirs and did maintain a more uniform flow than we now have, but they did not prevent freshets when the warm spring rains came on a great depth of snow laying on frozen ground, or when a big downpour fell

on fully saturated ground and swamps full of water—but who wants to restore that condition? Cultivated fields will not absorb as much water as forest bramble. There will be more soil washed away from a plowed field than a meadow or forest, but of what value would the forest be if there were no cultivated fields to support the people who create commerce, build cities, and what use or value would there be for forest products? Of what advantage is it to let timber that is valuable stand and deteriorate?

Much has been said about the wanton destruction of the forests in the West on lands which were not at the time necessary for settlement. If it had not been for cheap lumber in the West during the last half of the last century, there would have been more hardships, more difficulties in the settlement and subjugation of that vast country. The plains were timberless except the few trees, worthless for timber, on some oasis, or fringing the larger creeks or rivers. Cheap lumber brought from other points was a necessity to build the shack or shanty shelter of the pioneer in a stoneless country and to fence the fields before the day of barbed wire.

Cheap lumber has been a great factor in the upbuilding of our country, and cheap lumber must mean careless and wasteful methods of lumbering because you must take only the best and easiest to get.

While past methods here and present methods in some environments and under some conditions have been and are justifiable, there is no justification or excuse for the continuance of some of those methods. So long as the bad effect of any method is overbalanced by the benefit to the community, then that method is justifiable. When it ceases to be more beneficial than harmful it should change. That time has come when many improved methods can be adopted to the advantage of all, and whatever you expect to be adopted must be of some advantage to the state and to the community, and it would be a good business proposition, to reforest and protect all the hills not utilizable for other purposes.

IT is useless to advocate the general reforestation of our hills as a work of the small individual owner or farmer in any large way for many reasons. Wherever land is more valuable for any other purpose, it would not be reasonable to expect it; where it would be profitable, few of the dwellers on the hills have the capital to invest in the planting or are able to carry the plantation for a prospective profit fifty or sixty years ahead, and even if they had the capital it could, as a rule, be used to greater immediate advantage.

Reforesting and conservation on a large scale is a state proposition, or a proposition for large timber-using corporations. A corporation, which is a perpetual individual, could well afford to replant where necessary or allow it to reforest itself to such an extent as would cover depreciation, or restore current exhaustion, and in this way provide for future needs. This is now being done by many pulp and other like companies for the annual supply of ties.

The farmer, the individual, can conserve in a small way on his wood lot or sugar orchard, or can even reforest by using his otherwise idle moments and in this way capitalize them. In a small way each can conserve and protect, beautify and improve his surroundings, while at the same time supplying his present needs and providing for the future. Such a policy, consistently followed, in a few years will surprise you by its extent and magnitude. Clear up the brushwood to give the new growth a chance to grow, cut and trim out the matured and surplus growth, so that it will not be using the soil food that should go to the other trees; protect your own lots and help protect your neighbor's from fire.

Cultivated fields and light-soiled pastures should be protected from unnecessary washing or gullying so that as little soil as possible is carried off to fill the brooks or make some delta thousands of miles away. All that is needed is a little common sense, thinking and observing and doing what is necessary to be done when the need is first noticed. Every one of these sand wastes we have around here started first from a break in the soil and could have been stopped before any considerable damage was done.

Each farm has its peculiarities. A little thought and study will determine how many of these new notions or how much advice coming from all sides is of benefit or can be made use of, but one must first have full information of what has been done and what is being done. It is just as foolish to consider any proposition, without knowing what is going on, as it is not to consider it at all, or to blindly follow every latest fad, or to stick sullenly and blindly to old-fashioned ideas.

ANYTHING will come out all right if it is approached from a practical standpoint, and brains and experience and, above all, observation are used. Know what is going on; follow the good and discard the bad.

If reforestation and conservation on a large scale is the work of the state—how is it best to go about it?

Vermont, with its beautiful vistas of hills, valleys, lakes and streams, or its broad panoramas, with distant background of superlative landscape, will always be sought by those in search of vacation and recreation.

There are wilder, more majestic and sublime or awe-inspiring sections of the country, but none more beautiful in its combination of cultivated and rugged variety. The greater the development, the greater will be the beauty and the possibility of that reposeful enjoyment which so many prefer to imposing grandeur.

Certain states, as well as the United States, have established reservations for conservation and preservation purposes.

The hills and mountain-valley streams of Vermont were once and should be the home abiding place of all kinds of useful wild life.

Burned-over mountain-sides and sawdust have dried and filled up many of our streams. Illegal hunting and fishing have done the rest and have virtually destroyed

the fishing and shooting and are retarding all attempts at restoration. From both the æsthetic and practical standpoints, all this should be remedied. It can be done, to a certain extent, by rigid enforcement of proper laws and the repeal of laws made for effect only, not to be enforced.

If the State should establish several reservations, which should include the head-waters of our rivers, and re-establish and protect upon the hills the natural timber growth, make some improvement in the course of the streams, and protect these reservations absolutely from all kinds of depredation and destruction, it would in time restore all that Vermont once had, with all the additions which time and experience have proved to be useful. These reservations would be the nurseries of game and fish for the lower streams and valleys.

It would benefit the State both as a place for habitation and resort. It would be a source of large profit to the State from an actual return in money derived from licenses for fishing, hunting and from sale of lumber, while the indirect return would be almost beyond estimate. Vermont is well able to make the original investment of capital which would bring ample returns in enjoyment and pleasure and add so greatly to the prosperity of the State. All men filling the high public offices like some great reform or beneficial movement to mark their term. Here is an opportunity for our next governor to hand his name down to future generations.

TO aid our industrial development, reservoirs could be established at natural points, and in this way preserve the lower river reaches from excessive floods and establish that equable flow of water in the streams which is so necessary to industrial development.

There are many details to be worked out by actual experience. Only a general idea can be presented. There are no impossibilities, while the probabilities, æsthetic, industrial and financial, are great.

To make any such movement a success, no one individual, either by careless or intentional disregard of the rights of others or of law, should be allowed to destroy, by disregarding regulations and laws, that which was being done for the benefit of all. There is too much indifference to, and toleration of, the selfishness of individuals, which allows them by encroachments, small and large, upon common rights, to make impossible the full enjoyment by other individuals, or by the public as a whole, of their rights. It is time we stopped talking about that independence of the individual, which is in effect only surly self-indulgence and egotistical self-assertion and a bad excuse for bad education and bad breeding.

Accessibility and easy access and intercommunication are important factors in the development of the country for any purpose.

We should so foster our ways of communication leading in and out of our State that the coming and going can be made pleasant, comfortable and available.

We should see to it that our intra-state ways of intercommunication are the best possible, and, to show the best in our State, some should be purely scenic roads, coursing the ridge poles of our beautiful country. We are beginning to have a very perfect road system, but we must remember that we not only need to build roads but to care for them. The best made road begins to deteriorate the moment it is finished and the motor, pushing itself along by its wheels, finds the weak spots and unless attended to there is trouble for the road and discomfort, if not danger, for the user.

Eternal vigilance is the price of good roads.

If, in our striving for what is best for our State, we give first thought to its desirability as a place to live and get a living, with favorable and desirable environments and conditions, we have gone a long way towards making it even more desirable for the outsider, for the visitor.

It can be done without disturbing our comfort or our ease. It can be done with profit to ourselves and with little or no additional labor, if we only make effective every bit of labor we do.

We don't want to make Vermont the Switzerland of America, but we want to make it the Green Mountain State of America, unique and, of its kind, incomparable. We want to develop its natural charms and resources. We want to make it so attractive that it will hold its young people here and bring the absent ones back. We want all the world to come here and play with us, and all that can, to come and live with us.

WHITE PINE BLISTER RUST QUARANTINE

Governor S. V. Stewart, of the State of Montana, has ordered a quarantine against the importation of any five-leaved pines, currant and gooseberry bushes from the States of New Hampshire, Vermont, Massachusetts, Connecticut, New York, Pennsylvania and known infected areas in other localities suspected of harboring the white pine blister rust.

All quarantine guardians and deputy state horticultural inspectors have been instructed to refuse admission into Montana of any shipments of nursery stock of five-leaved pines, currant and gooseberry bushes from the above named states and to immediately deport such shipments or destroy them by burning.

THE government will soon ask for bids for 330,000,000 feet of government timber on the Oregon National Forest, much of which is Douglas fir. A strip of timber will be preserved for scenic effect along the projected road through the forest reservation.

WASHING logs for safety's sake is the manner in which a western camp follows out the new economic principle of "Safety First." The logs are scoured by jets of water, to remove broken stone, gravel or other such material, which might, if struck by a swiftly revolving saw, cause the saw to explode and bring death or injury to workmen.

HAVE YOU NOMINATED A FRIEND FOR MEMBERSHIP?

Address by President Pack

[Following is the address of Charles Lathrop Pack, president of the American Forestry Association, at the Southern Forestry Congress, at Asheville, N. C., recently. Mr. Pack lived for some years at Asheville and his reminiscences of that city and surrounding country, thirty and more years ago, will be of particular interest, not only to the present residents, but to thousands of people throughout the country who know Asheville and love it.—The Editor.]

I CANNOT tell you how gratified I am to be back here in Asheville. The first time I stood on this spot where I am standing now was in October, 1883. There was no Battery Park Hotel at that time, but there was this beautiful hill and the grand mountains—old Pisgah and the others were here just as they are now. And Asheville was here with, I think, about fifteen hundred people. There were no pavements on the streets; there was hardly a bank in town. I recall shortly afterwards, when my family came here to make their home, their life home, and about that time my father, George W. Pack, purchased the property which is now known as Aston Park. Very few of you ever met that grand old gentleman, Mr. Aston, one of the best assets this town ever had. And when it was found that the owners of the property would take $7,000.00 for it, the question arose as to how to get $7,000.00 to Asheville, and so I was sent North and brought the $7,000.00 to this place in a suitcase, largely in one and two-dollar bills, and the largest bill was $5.00. The money was paid over, and my father and myself had the satisfaction of seeing the money go into circulation down here. And over there on the public square, often towards noon-day we would stand together and question each other as to whether Colonel So and So, or Major So and So, had received any of the money yet, and I assure you we could tell how fast it circulated—see it circulate—because the men with the money stood up straighter and walked faster. The land was later presented to the City of Asheville by my father and named Aston Park.

I could tell you many interesting things in regard to those early days in Asheville. Our family were the first Northern people to come here. The grandest hotel in town was the Hotel Swannanoa, and when I came here they charged a dollar a day and changed the table-cloths once a week. And Mr. Ruben R. Rawls, who is still living, was astounded when he was offered $2.00 a day for five people if he would re-paper the bedrooms and have a little better food. And about as soon as he got the house re-papered, other visitors from the North began to arrive.

I became greatly interested in these mountains, where nature has done so much for man. I recall about 1885 or 1886 going up the Pigeon River (some of you have been up there, perhaps, fishing in the Smoky Mountain region) and staying with a moonshiner. Theoretically, of course, there is no moonshining in North Carolina; practically—well, we don't talk about it. But I stayed with this moonshiner. We arrived about noon and he invited my friends and me to dinner. We had roast suckling pig and broiled guinea fowl and fine corn-bread and good sweet-potatoes—the table fairly groaned with the good things of North Carolina, and there is no state where there are more good things than right here. And after dinner we were taken out, down the gallery at the side of the house, and he opened a little door and wheeled out a keg on to the veranda. He then passed around little baby gourds, and said, "Gentlemen, help yourselves." Well, that was corn whiskey, about as clear as water and nearly all alcohol. Well, I was doubtful about the results, and when nobody was watching me, I tossed the gourd full of whiskey on the ground behind a veranda post with a clinging hop-vine. I thought I was unobserved, but a little fellow, about four years old, in a yellow slip of homespun, came pattering along the veranda, and ran through the gangway calling out, "Grandma, the little fellow can't drink as much as Mama."

IT is a great pleasure to me to bring to you the greetings of the American Forestry Association. Some of you, perhaps, do not know about the American Forestry Association. It has members in every state and territory in the Union, including Hawaii and Porto Rico and Alaska. It has thousands and thousands of members. Perhaps you will permit me right now to tell you that in the last five and a half months over 2500 people have joined, paying $3.00 to $100.00 apiece. It is an American association that stands for all that is best in forestry, and I bring you the hearty greetings of the Directors of the American Forestry Association, wishing you God-speed in the splendid work you are doing.

I think, as Forester Graves told you, that there is no part of the country that needs scientific forestry more than the Southeast, and I do not know of any part of the United States where forestry, properly conducted, can do more for its people than it can in this region. And you will do well to organize in every Southern State a forestry association, or at least a fire protection association, so that you can get your equitable share of the money for fighting forest fires, and preventing them, that is appropriated annually by the United States Government for that helpful work which the Government undertakes in coöperation with the states. Many of the Southern states have received none of that money, and therefore have none of the benefits, simply because they are behind the times. I have lived for the last fifteen years in New Jersey. I know some of you, who live in a part of the country where you have more blessings, don't think that New Jersey is even a part of the United States, but be that as it may, we are a great State in many ways. Forty per cent of the area of New Jersey is in forest. Some

people think of us as raising politicians and . . . other sorts of agricultural products, but we raise timber, also, in New Jersey, and we have a forest fire system which I think is second to none. As Forester Graves can more fully explain, we receive, through his department, help that comes through appropriations in connection with the Weeks Law. This is a benefit received every year, and it is in that connection that we realize we are a real part of the nation.

THERE are a great many forestry questions coming up that are of interest and importance. You all know something about the great destruction of the chestnut that has taken place in the East—the so-called chestnut blight. Up in our part of the world—New Jersey—and in some other states, you rarely see a chestnut tree that is alive. When you look off across a wooded country, you simply see the skeletons of the former chestnut trees standing in the air, in most cases without bark. The ravages of the chestnut blight were not stopped, and now, people of North Carolina, you have the beautiful five-leaf pine—white pine, as we call it—and you want to look out, because there is another great scourge, and that is the five-leaf pine blister rust. It is all over New England and elsewhere and spreading rapidly. It got a big start before the scientific men spoke out loud about it. You must be wide awake to the danger or you may soon have only sick or dead chestnuts and sick or dead white pines to look at.

I saw a forest in Massachusetts the other day, coming down through Lenox, beautiful white pine trees, such as you see in some parts of Western North Carolina, and the greater portion of them were infected with this terrible blister rust pest. You will want to be organized in every state in the mountain region for many reasons, but you particularly want to hurry up your organizations so you can properly face this danger. There are other men with greater technical knowledge than I have who will talk about this white pine blister rust at this Congress. But I beseech of you not to underestimate the importance of this terrible calamity which threatens us with the possible extinction of the white pine.

Now, gentlemen, there are a great many things I might talk about, but you have many more experienced speakers than I—people who have a live message and, therefore, I will say only a few words more. The forests of America are increasing in potential importance, particularly on account of the great war. Do you realize that in Russia, in the Balkans, in Belgium, in Galicia, in France and England—everywhere—there is terrible destruction of forests? For now on the battle-fields, where whole forests have been felled, there is much the same scene of desolation as some of your mountain-sides used to have when the tobacco crop farmers deadened the trees. But that is not all. England and France formerly imported a great deal of their lumber from Russia and the Rhine, and they are now cut off from that source of supply. The ocean freight is so high and the shortage of ships so great that a comparatively small amount of lumber has been shipped to England and they are cutting down the fine old picturesque woodland parks over there. One of the most picturesque, as well as the saddest, things of the war is this: there was organized in Canada a body of woodsmen—2500 men or more. Some of them months ago paraded the streets of Ottawa clad in khaki trousers and Mackinaw shirts. They carried saws and axes, or peveys or canthooks, in addition to fire-arms, and those 2500 men have been taken to England—they are there now; and what are they doing? They are cutting down the historical old forests of England because England has to have the timber for mine props and for other necessary things, on account of the terrible shortage of lumber and wood at this time in England. What will England look like when you and I go back there after this great world-war is over and find that the forests have been cut so that we cannot recognize them? I received word only Saturday last from one of those Canadian men who is working in the south of England, in the forests, and he was permitted by the censor to send a letter to me. He said, "Really, my friend, we men of British Columbia, who have been used to cutting down the forests of Canada, really feel sad to cut down these magnificent park and shade trees, but such is war."

NOW, all this has a great relation to the forests of the United States. I do not need to tell you that the potential value of our forests will be greatly increased by this terrible destruction of timber and the uses for lumber that will come after the war. So it is important that we think more of our forest reservations—more of the great heritage which we should leave to posterity, and we should take care of these estates of the people which mean so much to us, not only from a financial and economic standpoint, but from other standpoints. You, here in this region, have been greatly blessed because you live so near to nature. And I think every one of you will agree with me that the frequenter of the woods, the American forester, the man or woman who can climb these hills and see these grand products of nature, and all true frequenters of the woods, are men and women of artistic feeling. The tree has ever been the symbol of life, strength, beauty, and the eye of man cannot continue to look upon these monuments of nature without their beauty being reflected in his life, making him a happier and a better man, and their destruction, ladies and gentlemen, means not only the removal of one of our natural resources from a practical and utilitarian standpoint, but also from the viewpoint of morality, of happiness, of beauty and of spirituality. And I am sure you agree with me, that there is no compensation for such a loss. I thank you.

The annual value of the farm woodlot products of the United States is over $195,000,000.

MORE people spent their vacations on National Forests during the summer than have ever done so before, many persons traveling long distances by automobile in order to camp in these public playgrounds.

Forestry for Boys and Girls

by Bristow Adams

The Wooden Horse—But What Wood?

"WHAT kind of wood was the Trojan horse made of?"

"What kind of what?" I said, looking up from the newspaper, in response to the ten-year-old's query.

"You know; the wooden horse that the Greeks got into, and then the people of Troy dragged it inside the city, and the Greeks got out and captured 'em."

He was looking at a set of books that I bought because it was advertised to answer every question a child could ask, and therefore seemed a good thing for our family of four children. So far it seemed only to suggest new subjects about which questions could be asked. This Trojan horse idea was a fair sample. It showed at once that I did not know more than the twenty volumes contained. Not that I minded any such little thing as that myself, but it seemed to disgust the children so much, and to give them such a poor idea of their father.

Maybe old Homer tells somewhere what kind of wood it was; if he does I have forgotten it. It was always just a wooden horse to me and no more. I thought it might have been pine because pine is easily worked; in this case, however, it seemed to all of us that the Trojans were the ones who were easily worked. Then we got to discussing the fact that to most folks wood is just wood.

Yet every kind of wood is different from all other kinds, and even trees of the very same kind will give different sorts of wood. I have seen two pieces of Cuban pine, one of which was twice as heavy as the other, and of a much darker color. It grew more slowly, had more pitch, its annual rings were closer together; almost anyone picking up the two pieces would have said they came from trees entirely different from one another.

THROUGH thousands of years certain woods have been recognized as best suited to certain uses. In the main, these have been the right uses for the woods, but people got so set in their ideas that they thought no wood, other than the one they had long been accustomed to, would do for a particular purpose. Now we are finding out that little-known or little-used woods are just as good as the time-tried ones.

At the same time it must be granted that for some woods there is nothing else "just as good." Hickory is one of these, and nothing does so well for the handles of tools that strike, such as hammers, picks, and axes. It is elastic and tough, and will stand shocks which would shatter handles of other materials. For the same reason it is the exclusive wood for golf sticks; were it not used the amateur golf player would have even more excuse for bad words than he now has when he hits the ground instead of the ball.

The driving heads of wooden golf clubs are made of persimmon or dogwood because these are hard and heavy and will stand knocks without being splintered or badly dented. For the same reason they are chosen for making bobbins and shuttles in the cotton mills. These are thrown back and forth, through the warp of the cloth, hurled by steel, striking against steel, and being hurled back again. Other woods have been tried, and none of them lasted long enough to make their use worth while. It can be truly said that they are the only ones which will "stand the racket."

PENCILS are always made with that nice smelly wood like the big drawer in mother's clothes-press," chirped up the youngest, who ought to know about pencils, because he manages to make away with most of mine. "I like the taste of it too," he

added. There is no doubt that he knows the taste, since the pictures which he draws are very, very black, and he needs to sharpen his pencils often. He does this sharpening with his teeth, like a squirrel.

The " smelly " wood in lead pencils is red cedar, or red juniper, and is about the only wood that is used for pencils. It is made into pencils very easily because it has a straight smooth grain; but the real reason for its use is that most folks carry a dull pocket-knife, and red cedar is the one wood which can be whittled by a knife which is said to be " so dull it won't cut butter."

Red cedar is also a good wood for fence posts and arbors and garden furniture. It contains an oil that helps it resist decay. This oil gives it the pleasant odor, which caused the little lad to designate it as the " nice smelly wood."

Cypress also is noteworthy for resisting decay; other woods that make good fence posts because they do not rot out soon are locust, chestnut, catalpa, sassafras and osage orange. The main trouble with osage orange is that it seasons so hard that one can hardly drive a staple into it.

EUROPE'S great war calls attention to many special uses of wood. One of the most pitiable results of the war is the call for willow to make parts of wooden arms and legs. It is strong and light, and tough. Aëroplane frames are almost all made of spruce, not only because it is stronger for its weight than other woods, but because it is so free from flaws and hidden defects. The very life of the air-man depends on this quality.

Aëroplane propellers are made largely of black walnut, sometimes glued in strips with spruce and ash. Warplanes are the most likely to have all black walnut propellers, because the wood holds its shape, is strong and even-grained. There is no way the propeller can be protected, because it must have all the air it can get to push against. But if a bullet hits it, the wood does not crack and splinter; there is only a small clean hole. For somewhat the same reason black walnut is practically the one wood used for gun stocks; the woodlots of the central hardwood states, and even old gate posts and buildings are being stripped to supply the armies in France and Russia.

The decks of battleships are made of teak because it stands wear, is hard and strong, but mainly because water does not affect it. Its chief quality is that iron bolts, spikes, or rings set in teakwood do not rust out from the moisture held by the wood itself. The surface of teak always seems oily, and once it becomes seasoned or dried out, it does not readily take up water again. Like black walnut, it does not splinter when struck by shot or shell.

MANY others can be mentioned; if one set out to make a list it would be a very long one; boxwood for wood-engravings, spruce for violins, because its fibers carry tones so well; spruce also for pulp from which paper is made. Rugs, furniture, pulleys, buckets, cloth, and all sorts of things are now made of wood by way of pulp.

THESE odd uses of wood have a real bearing on the work of foresters, because the forester must know how to grow the kinds of woods that are wanted, and to keep out of a well-managed forest those trees which do not furnish useful lumber. Such poor trees, therefore, are like weeds in a field of good grain; they take up room and are not worth the room they take. Foresters may go even further than that, to make individual trees grow so that they will suit special uses. Hickory and chestnut grown rapidly from sprouts furnish the best material for the peculiar uses to which these woods are put.

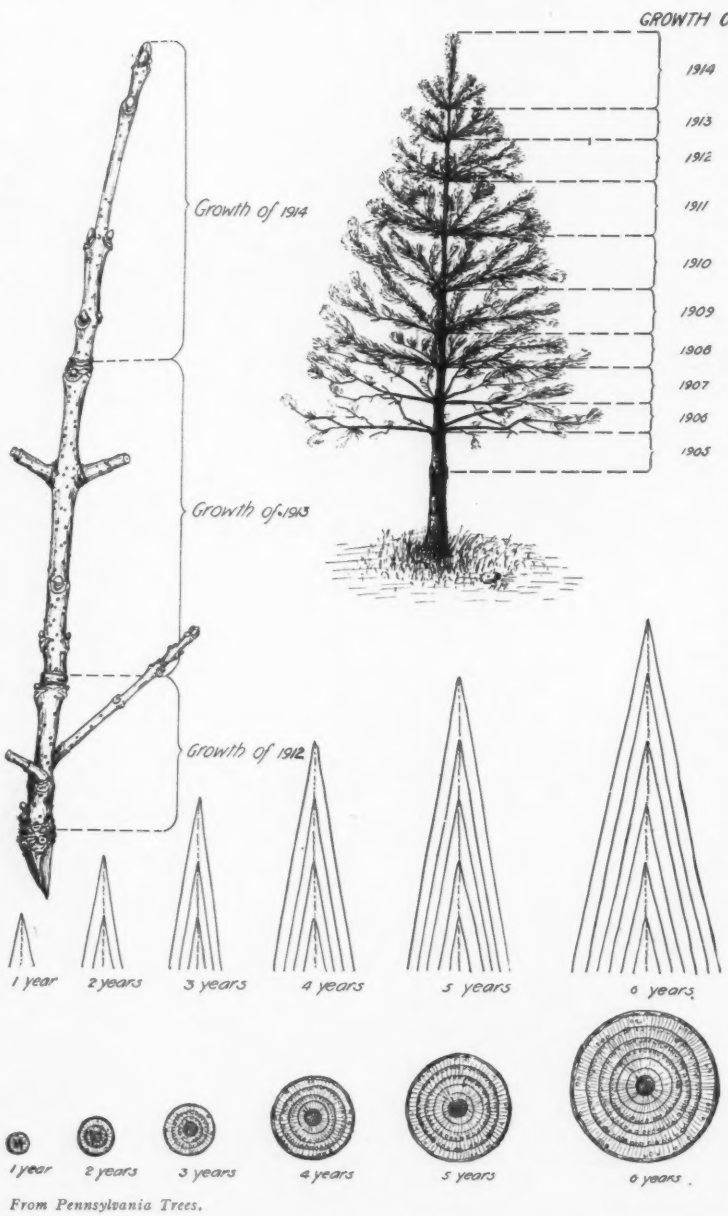
BY side-tracking them from the Trojan horse I thought I had been able to make them forget the first question; but that is a trick that all children seem to see through, and I finally had to own up that I did not know any more about it than they did. Then I told them that my newspaper was made of wood, and left them busy hunting for the ground up splinters and fibers that showed in the unprinted margin. They had their piece of newspaper and I had my newspaper in peace.

How To Tell the Age of Trees

TO TELL the age of trees is always fascinating. The best test is to count the annual rings on a cross-section of the stem near the ground and add to this number as many years as it took the tree to grow to that height (see the two lower series of drawings in the plate).

A second test applies to such species as white pine, which develops lateral branches in distinct and rather regular whorls (see white pine in illustration). Each whorl normally represents a year's growth. If the branches have fallen off, the scars of the branches may be seen on the stem.

The age of young trees or small branches can also be determined by counting the rings of terminal bud-scale scars (see upper left hand figure). The portion of the branchlet, from the end down to the first ring of bud-scale scars, represents the last season's growth, while that between the first and second rings represents the next to the last season's growth, and so on.



From Pennsylvania Trees.

After you have been successful in determining the age of a few trees you may find yourself questioning the age of others as you walk or drive by them. A careful study of their growth will often indicate the successes and failures which they met during their development, since a relatively narrow ring often indicates a struggle, while a wide ring often indicates favorable growth conditions.

Some trees reach great size and enormous age, while others remain small and die young. The size and age which a tree attains depend upon the inherent tendency of the species and the factors of its environment. Some species which naturally grow tall and become old may remain small under unnatural and unfavorable growth conditions. Other species never become large and old under the most favorable growth conditions, since it is inborn in them to remain small.

A definite age limit cannot be fixed for each species, but for general convenience we may classify the common trees as long- or short-lived.

Of the trees in the Eastern states, the oaks, chestnut, buttonwood, tulip, white pine and hemlock may be considered as long-lived trees, while the poplars, willows, birches and some cherries are short-lived.

Most of the native western trees, particularly the sequoia, Douglas fir, sugar pine, and cedar, are long-lived.

HAVE YOU NOMINATED ONE OF YOUR FRIENDS FOR MEMBERSHIP?
WHY NOT DO IT—NOW WHILE THIS REMINDS YOU?
WE NEED 5,000 MORE MEMBERS THIS YEAR.

Appalachian Forest Reserve

COMMITTEE'S REPORT

The Executive Committee, appointed September 23, 1915, at the meeting at Washington of the various associations interested in forwarding the extension of the Appalachian Forest Reserve (which action was followed by Congress making an appropriation of $3,000,000 on August 9, 1916, for the purpose), presents this report.

The meeting followed a call of the American Forestry Association for joint national effort to secure from Congress further support for the extension of the work on the Reserve. It was attended by representatives of the following organizations:

THE AMERICAN FORESTRY ASSOCIATION
MASSACHUSETTS FORESTRY ASSOCIATION
SOCIETY FOR THE PROTECTION OF N. H. FORESTS
NORTH CAROLINA FORESTRY ASSOCIATION
APPALACHIAN MOUNTAIN CLUB
APPALACHIAN PARK ASSOCIATION
KNOXVILLE BOARD OF COMMERCE
NEW HAMPSHIRE STATE BOARD OF TRADE
WESTERN NEW ENGLAND CHAMBER OF COMMERCE
PENNSYLVANIA FORESTRY ASSOCIATION
CONNECTICUT VALLEY WATERWAYS ASSOCIATION
SOUTHERN COMMERCIAL CONGRESS
NEW HAVEN CHAMBER OF COMMERCE

A Memorial was prepared, and was presented to the Hon. David F. Houston, Secretary of Agriculture, at a meeting at his office attended by all the delegates. This Memorial (which was printed in AMERICAN FORESTRY for October, 1915), gave succinctly the history of the movement which originated in 1899, and showed what had been so far accomplished, and that only approximately $8,000,000 of the $11,000,000 appropriated by Congress in 1911 had been expended. The necessity for further appropriation was urged,—the unexpended balance of $3,000,000 no longer being available, it having lapsed from non-expenditure within the time limit set by the Act of 1911.

The country is to be congratulated on the favorable action taken by Congress in the bill making appropriations for the Department of Agriculture, in which there was appropriated $1,000,000 for the Appalachian Reserve for the fiscal year ending June 30, 1917, and $2,000,000 for the fiscal year ending June 30, 1918.

In addition to the organizations attending the conference with Secretary Houston in September, 1915, many other influential bodies throughout the country joined in and supported the movement, and the favorable result has brought widespread gratification as a wise and progressive action forwarding a program of national development full of promise of good to the agricultural, transportation, and business interests of the country,—and economical in the fact that any intermission now in the great work on which $8,000,000 has been wisely expended, would result in great loss, as stated in the Memorial adopted in September, 1915, from deterioration by fire and flood, an unnecessary loss that would greatly increase the ultimate cost of properly completing the work.

The Committee desires to acknowledge with high appreciation the widespread and active coöperation of influential organizations and individuals throughout the country as soon as it was requested by the American Forestry Association and also by this special Executive Committee. The necessity for the inception and continuance of the movement for the Appalachian Reserve has now been made manifest to the country, thanks to the effective work of those coöperating, and on behalf of all who have been thus interested, the Committee begs to express to the members of the Senate and of the House of Representatives grateful and hearty appreciation for the attention given to the letters and statements presented, explaining the need of the appropriation now made, and for the action finally taken in furnishing the means to carry on this great national improvement.

HENRY STURGIS DRINKER,
President of Lehigh University
PHILIP W. AYRES,
Forester of the Society for the Protection of New Hampshire Forests
PERCIVAL SHELDON RIDSDALE,
Executive Secretary of the American Forestry Association
} Committee.

CONDITIONS IN MAINE

THERE is a marked tendency on the part of small owners and speculators in Maine to cut their forests clean for pulpwood, writes a correspondent. Land with $15 an acre of saw-logs to 12 inches will often have $30 an acre of pulpwood left. Taxes are *never* reduced after cutting the saw-logs. Owners desiring to dispose of their lands frequently now sell all the saw-log and pulpwood stumpage and then turn what's left back to the state. In one instance an owner of 10,000 acres, who had determined to put his money into another form of investment, was offered $16.00 an acre, and could not get the $20 that he asked; and then ran across a pulpwood operator who offered him $3.25 a cord right through for all soft wood including some poplar and white and yellow birch. Last fall he said they had cut over not quite half his land and had turned in $245,000 in stumpage. He will net better than $50 an acre and get cash payment in two years. No wonder he is not interested in conservation.

Standing Timber Insurance

By W. R. Brown

UNTIL recently there has been little or no insurance offered on standing timber in the United States and no formulated opinion on the subject. Lloyds of London, the first company known to have offered standing timber insurance in Canada, placed it on excess loss over a given amount on separate limited tracts, or, in other words, the owner was the initial co-insurer, to a large extent, on his own land, Lloyds merely taking the additional risk over and above a stated amount on various restricted areas. The Phœnix Assurance Company of London, in their Pacific Coast Department, this year is offering a limited line on green standing fir, spruce, cedar and pine timber in Oregon and Washington, west of the summit of the Cascade Mountains, on prearranged stumpage value, to owners at from to 1 to 1½ per cent, and to bond holders at from ½ to ¾ per cent, over a full season. Such timber must be accessible to market, not unduly exposed, and only one risk is taken in certain zones or fire areas established by the company. No risk greater than $17,500 is written in any one fire area. The rate of 1½ per cent is made up of ¼ of 1 per cent for the wet, and 1¼ per cent for the dry season, for which part no return premium is payable, and it is interesting to note that 33⅓ per cent is taken off of all premiums for approved patrol.

Formerly, when old line insurance companies were approached for standing timber insurance, they invariably shook their heads and mentioned the great amount of capital tied up in timber, the vast reserves necessary to cover such values, the danger of a general conflagration, the inevitable dry season, and quoted from some exaggerated newspaper report, and stated that in their judgment such insurance would be hazardous in the extreme and require an unreasonable rate. On the other hand, timber bonding houses and large owners, who had gone many years without suffering serious loss, asserted there was no unreasonable danger, provided the tracts were well scattered and of sufficient extent, and large bodies of timber insured themselves. Small owners instituted as much protection as possible and took their chances of complete loss.

No accurate data existed as to the location, extent and damage done by fire, and almost no organized protection existed. Meanwhile estimates made by newspaper reporters were taken in the popular mind as actual facts. To meet these conditions, the United States Forestry Department in 1905 commenced the scientific administration of public lands and included adequate fire protection and the gathering of statistics. State forestry departments followed its lead, and private fire protection associations sprang up, the first organized in the Pacific Northwest six years ago, and thirty or more elsewhere throughout the Union. Railroad coöperation was secured. Protective laws were passed and enforced. A campaign of public education was carried on and field methods improved. Accurate statistics were gathered as to the causes of fires and at what points they were liable to occur, what proportion of the values was being consumed each year, and how fires could be minimized and, in a measure, foreseen and anticipated. The compilation of this data has led the writer to believe that the present loss by fire in standing timber is apparently not any greater than that in other forms of property, and that insurance in some instances is desirable on standing timber, and that an inter-insurance association among owners can now be formed and be both economical. successful and beneficial.

Without going too much into the dry details, the writer will sketch his reasons for his opinion that timber is insurable and the principles on which such inter-insurance association should be founded:

First, there is at hand five years of fairly accurate data collected by the agencies above, which show, on an average, a loss in value of less than ½ of 1 per cent and this average loss through increased protection is *constantly diminishing*. For the twelve western private forest protection associations, amalgamated under the management of Mr. E. T. Allen, and which cover an area of twenty-two million acres, there has been spent yearly about $200,000, or nine-tenths of a cent per acre per year, and as to the average annual loss I will quote from a letter received from Mr. Allen:

"I have your inquiry of April 25th. About all I can do is to compute the feet of merchantable timber destroyed, with a very rough estimate of the total stand under protection, which in percentage would apply about equally well to values. This gives us in 1910 a loss of ½ of 1 per cent; in 1911, $^1/_{150}$ of 1 per cent; in 1912, $^1/_{166}$ of 1 per cent; in 1913, $^1/_{10000}$ of 1 per cent; in 1914, $^1/_{10}$ to $^1/_{15}$ of 1 per cent; and in 1915, $^1/_{220}$ of 1 per cent. . . . Nobody knows, of course, but we should guess that (as 1914 was as bad a year as 1910 in hazard, and improvement of methods got us through with a tenth of one per cent loss), it is pretty safe to say that (as a year five times as hazardous is almost inconceivable), we shall never equal half of one per cent again unless war or some other disaster destroys our protective system itself."

The New Hampshire Timberland Owners' Association, with a million acres on which they spend one cent per acre per year, sustained a loss in 1911 of ¼ of 1 per cent; in 1912 of ¼ of 1 per cent; in 1913 of $^1/_9$ of 1 per cent; in 1914 of $^1/_{10}$ of 1 per cent; and in 1915 of $^1/_5$ of 1 per cent. The Northern Fire Protective Association of Michigan, with an area of two million acres, on which they spend 1 cent per acre per

year, reports yearly losses as follows: 1912, $^1/_{10}$ of 1 per cent; 1913, $^1/_{20}$ of 1 per cent; 1914, no report; 1915, $^9/_{10}$ of 1 per cent. The St. Maurice Valley Fire Protective Association of Quebec, with an area of eight million acres on which they spend ¼ of 1 cent per acre per year, reports the following losses: 1913, ½ of 1 per cent; 1914, ¾ of 1 per cent; 1915, when one big fire got away, 1½ per cent. These being the large representative private associations in four widely scattered sections of our country and Canada.

Even the fire hazard, represented in the popular mind by a general conflagration, a more accurate statistic will show (when compared with the value of the remaining timber stand in the states in which they occur) is a small percentage of the whole value involved. Minnesota with a forest wealth valued at 280 millions, during the last ten years has had a computed loss each year of only $100,000, or about $^1/_{34}$ of 1 per cent annually. Maine, with a valuation of 100 millions of timber, lost for four years, from 1909 to 1912, $64,000 annually, or $^1/_{16}$ of 1 per cent. In the United States Forestry Bulletin No. 117, entitled "Forest Fires," it states that in 1891, a very bad year for fires before there was any protection, the annual loss throughout the United States was $25,000,000. If the 550,000,000 acres of timbered area in the United States was worth at that time on an average of $5 an acre, this would be a little less than 1 per cent loss yearly.

Conflagration hazard for insurance purposes could be counteracted by the distribution of small individual risks widely placed over various sections of the country among many owners under various climatic conditions, giving preference, if possible, at the start to a country broken by settlement, and in which the yearly losses prove to be the most uniform, like New England. Past computations usually have paid small attention to the fact that a considerable percentage of such fires occur in cutover and so comparatively worthless lands, and that where burned timber was reasonably near to market much salvage could be taken. Estimates also included value destroyed in young growth and the burning of the soil, which set back the productivity of the land. While these two losses are very real, and in the end should be protected by insurance, for immediate practical reasons soil and growth are not included in this paper. It is true that there are foreign timber insurance companies in Germany and Sweden which insure young growth and soil as well, but the method of computing values is so complicated, with its growth tables, species, methods of management, expectation values, markets, etc., that it is not practical or applicable to American conditions now, and is impossible.

All told, there are 92 million acres with more or less private protection and 187 million acres with more or less public fire protection, or, in other words, about half of the timbered area of the United States. In 1913, statistics show that public and private agencies spent a little less than a million dollars on 250 million acres, being four-tenths of a cent per acre annually. Insurance should be restricted to the areas which are adequately protected.

To meet the difficulty presented by law in some states to the establishment of fire insurance companies, calling for immense reserves to assure the great values tied up in timber, the difficulty of obtaining charters from legislatures conforming to multitudinous requirements, the difficulty of restrictions placed upon doing an interstate business, it is possible to form an inter-insurance association like so many that are now operating among owners of timber yards, saw-mills and other industrial properties in the United States, with no record of failure. The inter-insurance associations, like the mutuals, are conducted at cost for the individual subscribers by crediting back the unused balance of premium to each account yearly. But unlike the mutuals, by doing no outside business, or business for profit, they are subject neither to Federal or State supervisory boards, and are easily organized and controlled by a board of supervisors. Business is done under the management of a single, mutually appointed attorney-in-fact, who acts separately for each subscriber. The office where this is done is called an exchange, as it is there that insurance is exchanged amongst subscribers. Legal opinion as to this has been given by Hon. John T. Barker, attorney-general of Missouri, on May 7, 1914, and Mr. Stites, corporation lawyer of Washington, D. C., in October, 1914. Some of such successful inter-insurance associations are the Lumber Manufacturers' Inter-Insurance Association of New York, with 300 members, attorney-in-fact, Wilcox, Peck & Hughes; Lumbermen's Exchange, Kansas City, Missouri, attorney-in-fact, J.W. Garvey & Company; National Lumber Manufacturers' Inter-Insurance Exchange, attorney-in-fact, Charles F. Simanson, Chicago, Illinois, and many others.

Granted that the average annual loss to standing timber would be about ½ of 1 per cent, and that the cost of management of an association would be about ½ of 1 per cent more, as is customary in the companies above, the usual rates charged by commercial insurance companies for ordinary risks running from 1½ to 3 per cent, the difference between these two of ½ to 2 per cent saving would form a sum sufficient to set up a reserve, which in a short time would be ample, if the individual risks were kept small and widely scattered, and only a limited line of insurance were written for each subscriber. After such a reserve was established, the subscribers would receive the unexpended amount of the premiums each year, or receive insurance at cost, retaining meanwhile partial ownership in the reserve. Reserves required are commonly $^1/_{20}$ of the amount insured, premiums paid in yearly are commonly from 2 to 3 per cent, actual insurance and management should cost about 1 per cent; the insurance allowed on one risk should be limited to a very few thousand dollars, or, if a large line is desired by one subscriber, it might be offered if each risk was widely separated from all others in zones predetermined by the association.

The question then arises, could timberlands stand the 1 per cent premium needed for loss by fire and management? In a strictly forestry sense, they could not, as it

is shown in an article by Professor Lovejoy, of the University of Michigan, in the Forestry Quarterly, that a tract of timber which has been wiped out by fire cannot be replaced by growing a new forest at the same cost as the current stumpage value destroyed. While this may be true in his premise of 100-year-crop rotation basis in forest replacement, it is also true that there is still remaining in America opportunity to purchase additional area at approximately the same stumpage price. While it is true that insurance of the timber would eat up a considerable percentage of the growth value (as over-assessed taxes do at present), insurance would, on the other hand, help the plantation and reproduction of trees, in bringing the expectation value of the crop from the future down to the present, and would insure careful superintendence and continuance of protection. Such protection would make certain both profit from growth, and what is of more moment, the increased value of stumpage. Such insurance is practically collecting the present worth of expectation value and commencing a new period of crop rotation. Professor Lovejoy, by proving how slight a yearly loss by fire to uninsured forest property will over a hundred-year period wipe out the profit of growth, proved the necessity of efficient fire protection, and how financially possible and advisable it is to expend yearly even a much greater amount per acre than is now commonly done. By the same argument, he also proved the advisability of insurance, as even the best of fire protective measures must necessarily stop short of complete protection; lightning will continue to strike; fires will continue to be set from unknown causes; and here and there a forest fire is inevitable; so that a wise man with a small valuable tract of timber in an exposed position will seek insurance in order that this irreducible minimum of hazard should be forecast and adequate provisions prepared to meet it.

The moral hazard in the insurance should be reduced by the co-insurance of members, indemnity to be limited to 80 per cent of the valuation. Reinsurance may possibly be worked out after the inter-insurance principles have been proved sound.

Inter-insurance would be of the greatest immediate value to the small owner or farmer whose tract is small, exposed and subject to total loss, as large owners with largely distributed risks practically insure themselves. If large owners will, however, join with the small ones, contributing each a small area, then when the association has proved a success by adding new members and increased territory, with its result of more uniform loss, greater reserve and lower premium, opportunity may be created for the carrying of a large line of insurance on the larger and more valuable tracts. The small and well-distributed risks at the start are more equitable amongst owners, as a more perfect classification of hazard and value can be arrived at and risks amongst owners can be equalized.

An initial guarantee fund is necessary to create an immediate reserve until such time as the surplus of premiums form such a reserve. This should be preferably a cash deposit. As most land owners are long on land and short of cash, however, to start the association and tide over the first two or three years, title to a small tract of merchantable standing timber could be transferred as a guarantee and accepted as security by the association, and returned when the excess premiums had become sufficient. Subscribers should be bound only to the close of each season and to the extent of their original guarantee, and could withdraw at any time, except in as far as they were bound to make good the losses and costs of management of that particular year. Management should be vested in a board of directors of five and the managing attorney-in-fact, who legally would be the agent of each of the subscribers, and to his judgment they would have to trust the initial complex questions of the relative hazard, acceptability of tracts, valuation, and protection required, in order that all might be put on approximately the same initial basis.

New England should be selected as the region to inaugurate such an association, as it is the most uniform in climate, and shows the most uniform statistics, and a more economic management and inspection could be effected if subscribers were not too extended. The managing attorney-in-fact should preferably be a trained forester with experience, judgment and ability. Classification of risks would call for consideration of the kind and character of species, exposure, soils, neighboring risks, accessibility to market, market values, climatic, physical and moral hazard, and many others, and such an association should start in a small way, proceed with great conservatism, and ask for coöperation and support for a considerable period, in order that a new and desirable opportunity be opened to the timber owner everywhere for the protection of his property and the encouragement of long-time management. Such an association would create a new profession, that of timber actuary. It would gather adequate data concerning fire risk. It would create a more definite market for cutover land and second growth. It would stimulate planting. It would encourage long-time management of lands and demand for adequate protection. Financially, if loans could be secured on insured standing timber for a portion of its value, as is done on other forms of property, and such released capital could be put at work for the owner, it is not unreasonable to suppose that it might earn enough more above bank interest to pay the cost of the insurance on the whole tract. Finally, standing timber insurance would assist in floating bond issues and increase the market value thereof.

HAVE YOU SECURED A NEW MEMBER?

We desire 5,000 new members before January 1, 1917. We ask each member to secure Just One.

Will you do it now?

The Lumber Export Market

THE Government will coöperate with the lumber manufacturers of the United States in sending abroad a corps of experts to study the condition of European lumber markets, with a view to a great expansion of the field of the American producer. This was decided recently at one of the most important conferences ever held in American business history, for the conference marked the opening of steps for coöperation between the nation's business men and the Government itself for the extension of American trade abroad.

Part of the result of the conference will be the urging of the immediate passage of the Webb Bill, now pending in Congress, to remove any question of the legality of the organization, by lumber manufacturers and other groups of business men of foreign sales agencies, to secure and distribute orders for American goods to be sent to foreign countries.

The Government was represented at the conference by two members of the Federal Trade Commission, Commissioners W. H. Parry and Joseph E. Davies, by the head of the Forest Service, Henry S. Graves, and by the chief of the Bureau of Foreign and Domestic Commerce, Dr. E. E. Pratt. Dr. Wilson Compton, economist to the Trade Commission, was also present in an advisory capacity. On the part of the lumbermen, there were present some score of manufacturers and secretaries of lumber manufacturing organizations, including the National Lumber Manufacturers' Association, the Southern Pine, California Redwood, West Coast, Northern Pine, Northern Hemlock and Hardwood and Gum Lumber Associations.

BEFORE taking up the question of how to organize the American lumber industry to best secure the great volume of foreign lumber business that must come to the United States, even before the European war ends, there were some detailed reports given of the conditions abroad, by the various interested organizations, as well as from governmental agencies. Briefly summarized, these conditions are as follows:

Belgium.—Forests entirely destroyed, the nation so wrecked physically and financially that it will have to be entirely rebuilt, and this rebuilding will have to be financed by the major powers.

France.—Northern France must be rebuilt, enormous distances of railroad lines laid, with a consequent demand, beyond estimate of quantity, for railroad ties, sleepers, and lumber to entirely rebuild the farm buildings, villages and cities of northern France. This need will be definite, regardless of the outcome of the present war.

England.—Its forests, as well as those of Scotland, denuded, the supply of lumber already exhausted, and imported lumber needed for all future building, until new forests grow to take the place of the timber cut to use for war purposes.

Italy.—The supply of timber is gone, used in war operations, either for Italy herself or her allies, and great quantities in immediate demand.

Spain.—The forests cut, and the lumber sold to warring nations.

Germany.—No estimate made of conditions, but the need is only less than that of the allied powers in proportion to the extent to which the German Government has foreseen the future and prepared to meet the emergency by the holding of great tracts as public forest.

Russia.—Has great supplies of standing timber, Baltic pine, chiefly, but not during the war, at least, available to the other allies and even after peace is declared not suited to the demand, owing to its lower quality.

TO secure this business, it was declared to be only necessary for the American lumbermen to go after the trade systematically, with an advance knowledge of the needs of the various nations, and the securing of information as to markets and business practices. It was stated that the French Government has already offered to buy enormous quantities of railroad timber on twelve months' interest-bearing notes.

The Government, through Dr. Pratt, called this conference in the belief that it was a function of the Bureau of Foreign and Domestic Commerce to assist the lumbermen to develop this market efficiently and the lumbermen voted to join in the movement by partially financing the expenses of trade commissioners to proceed at once to Europe and begin gathering information. The method of working out the underwriting of this expense was left to a committee headed by President R. H. Downman, of New Orleans, of the National Lumber Manufacturers' Association.

The organization of exporting associations, or foreign sales agencies, is favored by the Federal Trade Commission, and all question of the legality of such organizations is to be removed by the Webb Bill, introduced with the sponsorship of the Trade Commission.

THE most illuminating exposition of conditions abroad was made by John E. Rhodes, secretary of the Southern Pine Association, which sent a representative abroad several months ago, and whose reports, already fragmentarily at hand, show that the demand for lumber will be beyond belief. France, it was shown, as well as other foreign powers, is strongly prejudiced in favor of American lumber. The plan of rebuilding France, as being outlined by French governmental authorities, is to have towns and villages on the community basis,

with model farms on the American plan. The picture of utter devastation presented by Mr. Rhodes, as part of his showing of the opportunities for American lumbermen, was striking. It so impressed the representatives of other lumbering regions that they agreed that it was time for American lumber manufacturers of all sections to unite to care for this great market, regardless of whether the interested districts themselves were exporters or not. This was phrased by O. T. Swan, secretary of the Northern Hemlock and Hardwood Manufacturers' Association, operating in Upper Michigan, Minnesota and Wisconsin, when he said:

"We must realize that anything that assists in providing a market for another species of lumber helps the whole industry. A field that provides an outlet for southern pine relieves the hemlock territory of competition from the South, from mills which are selling at perhaps less than cost, to help the manufacturer secure cash to keep his men at work in dull times."

J. M. Pritchard, of Memphis, of the Gum Lumber Manufacturers' Association, said:

"We have seen the time in our Association when our manufacturers were actually selling at a price below the cost of production in order to keep their plants in operation. The extension of the market may not affect gum lumber to any great extent, but it will give the gum lumber manufacturers relief from some of the recent disastrous competition."

THE fly in the ointment was placed on exhibition by Thorpe Babcock, of the West Coast Lumber Manufacturers' Association, when he said:

"I just want to call your attention to the fact that, owing to the ocean shipping conditions, the West Coast Manufacturers, who have already at hand the exporting company, are unable to fill orders, for the lack of vessels in which to convey the sold lumber to the over-sea purchaser. Before this investigation can become profitable, this condition must be remedied by the providing of ships."

The problem of shipping, however, was left, with other details of the opening up of the foreign market, to the committee to be appointed by President Downman. Dr. Pratt said that his bureau, which will have charge of the investigation, will make its plans at once, in the hope that the investigators and agents can be on their way abroad by November 1.

TOURIST registers are in use on many of the National Forests. By registering their names and destination, persons going into the mountains can arrange to have telegrams and other important messages forwarded by the forest rangers.

EXPERIMENTS at the Forest Products Laboratory at Madison, Wisconsin, have resulted in the discovery of a method whereby the yields of alcohol and acetate of lime from the destructive distillation of hardwoods have been increased fifteen per cent.

WHITE PINE CONDITIONS

By Robert T. Morris, M.D.

THE area of white pine growth extends farther northward than would be indicated by the map on page 389 of the July issue of American Forestry. I have observed fine white pine trees in mixed stands as far north as the Hudson Bay post at Flying Post on the Moose River. Some of these trees were considerably more than one hundred feet in height, and I measured trunks up to forty-four inches in diameter. They were growing with jack pine, white and black spruce, arbor vitæ and tamarack, although the latter tree was apparently being killed off cleanly in the whole James Bay basin by saw-fly larvæ.

In connection with the saw-fly question, I can add one more pine to the list of victims in the Buttrick list. On my country place in Stamford, Connecticut, saw-fly larvæ have attacked the red pines (*Pinus rigida*) and would have killed some of them had I not detected the presence of the larvæ in time, and sprayed the trees with arsenate of lead. Saw-fly larvæ have killed a good many of my white pines at Stamford, but two species of aphis are responsible for the deaths of many more, several thousand young white pines, in fact. The white woolly aphis has been most destructive because the yellow ground-ants plant so many colonies upon the roots that the trees suffer not only from the aphides but from drying of roots along the ant tunnels. Another aphis of darker color and of a species not determined does not attack so many of my white pines, but it is very fatal to the ones that are attacked, and quickly, unless I happen to notice that the tree is attacked and spray it with tobacco extract. The black ants serve as colonizers for this species. Parenthetically I would add that a small reddish ant colonizes aphides, which are very destructive to Japanese, Chinese and cultivated varieties of American persimmons in Connecticut.

Among the enemies of the white pine in that State must be included rabbits and red squirrels. Both of these animals bite off the stems of very young pines destructively, and the red squirrel will sometimes nearly girdle white pines eight or ten years of age, although this latter injury is not of frequent occurrence. The weevils have lately attacked the few white pine trees that I had managed to carry past other enemies. Of the many thousand white pine trees that have been set out upon my property, varying in age from two-year-old transplants up to trees seven or eight years of age planted with balls of earth, it is a question if as many as fifty trees remain altogether. This means that in that particular part of Connecticut, at least, reforestation with the white pine would be practically out of the question.

THE rabies epidemic which is carried by infected coyotes is spreading eastward in Utah. Rabid coyotes are common in the entire western part of the State, and one has been killed within thirty miles of Salt Lake City.

Wood Preserving Department

By E. A. Sterling

IN the gradual adoption of wood-preserving methods by small consumers for farm and home use, the decision to use treated timber is usually based on the stated facts that decay of timber may be prevented indefinitely by the application of a proper preservative. Those most familiar with the theory and practice of wood preservation are apt to forget that the average consumer has had no occasion to investigate the reasons for the decay of wood, or to ascertain why certain oils or mineral salts will prevent or retard its action. It is, therefore, interesting to review some of the essential features of timber decay and its prevention.

Nature has provided for the return to the soil, or to conditions resembling it, of all organic matter after it has performed its life function. Otherwise the earth would be encumbered with dead animal and vegetable growths. The medium for this dissolution in the case of wood is mainly a low form of vegetable growth known as fungi. Bacteria may contribute to this result, but in a more obscure and less understood way than fungi. Wood-destroying fungi have their origin in microscopic spores which correspond to the seeds of plants. These spores are present everywhere in the air, and develop rapidly when they lodge upon wood under conditions favorable to their growth. The essential requirements for their growth are moisture, air, moderate temperatures, and food supply. These requirements obviously exist under most outdoor conditions, especially where wood is in contact with the ground, or at the ground line. The fact that all wood is not immediately destroyed is due to its inherent resistance, or to the absence of one or more of the essential factors, usually that of moisture. Furniture and wood used elsewhere indoors lasts indefinitely because it is dry, and is usually protected to an extent by a surface coating of paint or varnish.

THERE are several kinds of wood-destroying fungi, but all develop in practically the same way. The tiny spores germinate and send out invisible threads of growth which gradually extend through the tissues of the wood, breaking it down through the process of absorbing certain elements for food. This growth may develop gradually or rapidly, according to conditions, and frequently there is no external evidence until decay is firmly established or widely extended. These hyphæl threads may extend and work independently, or become massed together into what is known as mycelium, which is the scientific name of the mass of white fibers often seen between damp boards or under bark. Ultimately these feeding threads produce fruiting bodies which appear on the surface as shelf fungi, or what would be popularly called toad-stool growths of various forms and colors. In these fruiting bodies are produced the spores which reinfect other pieces of wood.

The function of wood preservatives is to have a toxic or poisonous effect on the fungi spores, so that they are killed or cannot develop. Since all decay originates on the outside, often a superficial coating of preservative oil or paint prevents decay for a time. Surface checks and other abrasions ultimately, however, give the spores ingress, after which they develop in the interior of the stick regardless of surface coating. It is for this reason that the most effective preservative treatment actually penetrates the tissues of the wood for a considerable distance, or, as in the pressure treatment, permeates either the entire stick, or at least the sapwood, which is the most liable to decay.

THE relative durability of different woods is an interesting subject in itself. This natural resistance to decay is considered in selecting woods for treatment, and is really a phase of wood preservation, although not concerned directly with the kind or application of preservatives. The durability of such woods as cedar, locust, osage orange, redwood and cypress is well known. With the reason for decay in mind, one naturally questions why these woods should remain sound longer than others. It is easier to ask the question than to answer it.

A wood like locust and cypress, which resists decay, must have some natural qualities which retard the growth of wood-destroying fungi in much the same way as artificial preservatives. Just what these qualities are is not clear. There must exist in these woods some natural oil or substance which is unfavorable to fungus growth. The dense heartwood of pine, since it is heavily impregnated with resinous substances, offers physical resistance to fungi by keeping out moisture and air. Cypress and redwood, on the other hand, are comparatively light woods without resinous contents. What retards decay in one case, therefore, may not be present in some other wood. In chestnut, which the farmers for years have used for fence posts, because quite durable, tannic acid is present in considerable quantity, and has been tried as a constituent of some preservative compounds. Among the durable woods, the sapwood, or outer portion, is less resistant to decay than the heartwood. This is for the reason that sapwood contains more starch and sugar which serve as desirable food for the fungi. This is well illustrated in the case of fallen trees of western red cedar which are often sound after lying in the woods for a century or more. The sap portion in all such cases, however, is completely rotted away, and it is only the heart which remains under the moist, decay-producing conditions of the forest floor.

Editorial

PRESIDENT WILSON SPEAKS PLAINLY

ONE of a number of bills, introduced in Congress with the intention of tearing down the bulwarks of our National Forests and of bringing these reserved lands under the operation of general laws permitting the alienation of titles and the acquisition of the land by states, communities and private citizens, passed Congress recently, only to receive a deserved veto by President Woodrow Wilson on August 22.

This bill, known as House Bill 11,162, would have given to every city and town, now or hereafter to be established, the right to take from national forest lands a total of 1440 acres for several public purposes.

The President in his veto calls attention to the fact that the existing laws provide ample means for the attainment of the public purposes contemplated by the bill. Cemetery grounds if needed can be eliminated by presidential proclamation. For municipal water supply, special coöperative agreements are in force which fully safeguard the interests of the public. Touching parks and recreation, the President says:

"The Department moreover is already providing for special local needs for recreation purposes by making the National Forests freely available for such uses and by taking steps to develop their availability as public recreation grounds." Continuing, the President points out the fundamental objections and dangers of this class of land legislation, a warning which is needed at this time. He says:

"The bill which I returned would give cities and towns the right to select and acquire a total of 1440 acres of land for the several purposes mentioned, at a uniform price of $1.25 an acre, without regard to the value of the timber on it or to the need of the land for other public purposes; or to the effect of the alienation of ownership on the administration of the forests, and especially upon the administration of adjacent or neighboring areas. Counties may select 640 acres. Since the same rights would accrue to new cities, towns and counties, this *general grant* might in the long run result in the alienation of a very large proportion of the national forest area.

"But the most serious objection to the bill is that it subjects the National Forests to disposition under a general grant. At the very time while provision is being made for purchase by the Government of forested lands in the East for the protection of the watersheds, it is proposed to permit similar lands in the West to be permanently alienated. I would respectfully urge that it is unwise to permit alienation of the National Forests under general legislation of this sort. If the process of piecemeal distribution is begun, independent of any oversight or control of the National Government, there is manifest danger that the forests will be so disintegrated as to make their efficient administration impossible and the purpose for which they were established unattainable.

"Against such a process the National Forests should be carefully protected."

What clearer, more concise and more convincing statement could there be than this utterance of the Chief Executive against the piecemeal distribution of our National Forests which is attempted by many and various bills at each session of Congress?

COMMERCIAL GRAZING VERSUS WILD LIFE IN NATIONAL PARKS

THE bill creating a national park service in the Department of the Interior, in place of the present inadequate piecemeal administration, is on the Senate calendar and should speedily pass.

But there is one provision in the bill as it stands which should be promptly eliminated before it becomes a law, and that is the opening up of these national parks to commercial grazing of sheep and cattle. As it stands, the bill permits the Secretary of the Interior to "grant the privilege to graze livestock within any national park, monument or reservation, when in his judgment such use is not detrimental to the primary purpose for which such park, monument or reservation was created."

There is only one primary purpose for creating a national park, and that is to preserve nature and wild life in its original condition for the pleasure of the entire body of our citizens. Cattle and sheep grazing are commercial uses wholly unharmonious to this primary purpose, and destructive of forage needed by wild game.

If portions of areas now reserved or proposed as national parks can be opened up to commercial grazing without detriment to the primary purpose of the park, it is *prima-facie* evidence that such areas should not be included within the park at all, but should remain as national forest lands, on which commercial uses are permitted and encouraged by law and regulations.

From an administrative standpoint, this provision has some very objectionable features. The Department of the Interior is without any experience in the management of grazing privileges, and at the present time does not take in a dollar of revenue from this source. The grazing policy and administration are wholly in the hands of the Forest Service in the Department of Agriculture, which has, in the eleven years since 1905, built up an efficient

procedure and brings in a revenue of over $1,000,000 per year.

Should a rival administration of grazing be set up on adjoining areas by the admission of grazing into national parks, regulations would have to be identical or users would exert pressure to have lands transferred from one department to another in order to take advantage of more favorable regulations. Political pressure would be brought to bear on the Interior Department, both to allow the extension of grazing in the parks, and to create new and larger parks in order to transfer grazing jurisdiction.

There is but one way of avoiding this danger, and that is to continue to prohibit grazing absolutely, as at present, in national parks, and to make the areas of these parks conform to the limits which must be preserved intact for wild life and for the primary purpose of recreation, which is sure to increase in importance and in the benefit which we all share as a common heritage.

The Oregon Forest Fire Association

By Wells Gilbert, *Treasurer*

THE Oregon Forest Fire Association was formed in January, 1911, with the threefold object of promoting coöperation among timber owners, inducing the State to assume its responsibility in forest protection and educating the public as to the causes and methods of preventing forest fires.

Many efficient fire patrols existed, but there was duplication of effort and little coöperation. In addition, these patrols from necessity guarded other timber lying in their limits whose owners were shirking expense and responsibility. Some timber was not being patrolled by anyone. Between the heavy timber belts and the farming regions is generally found the "stick-ranch" country in the foothills. Here pioneers cleared patches a few acres in extent, raised some vegetables and grain but depended on their stock for subsistence. Timber had no value in the early days, and their immediate interest lay in burning it and clearing the ground. If the fires got into green timber and burned the brush and dead grass, the grazing and hunting were so much the better. No authority existed for handling general conflagrations and the most destructive fires in the State have started in this region. The experienced hunter was at home in the woods, but the average city sportsmen and the farmer boys were often ignorant of the first principles of forest preservation. Surely, the time was ripe for better methods.

First, the Oregon Forest Fire Association in 1911 secured the passage by the Legislature of a model fire code. A State Board of Forestry was formed, and a practical woodsman placed in charge. One of this board is named by the Association. Suitable appropriations were made and patrolmen placed in the foothill country, thus protecting the main timber belt. Thousands of fire posters were issued by the State Board, the Association, and County Associations, setting forth the fire laws and penalties for their violation and careful instructions as to camp-fires. Many of these circulars, by word and illustration, vividly portray the tremendous waste in wealth and wages caused by fires.

A law was also passed requiring the private owner to patrol his timber during the dry season. If he fails to do so, his interests are looked after by the State or by neighboring patrols, and his land is assessed for the actual expense.

The Association has actively encouraged formation of County patrols. Our secretary acts as manager of these patrols, and the accounts are handled in his office. Each County Association is financed by the owners interested, who pay assessments on a uniform acreage basis, and is managed by a Board of Directors serving without pay. The State, the County Associations and the Forest Service coöperate and there is no duplication of effort.

The Association now represents over three million acres of timber land. It actively patrols timber lands when desired, but it has best served its members by securing needed legislation and by building up or combining existing patrols. Its motto, if it had one, would be "An ounce of prevention is worth a pound of cure."

The value of its work cannot be estimated. The State has had no destructive fires for several years, and as an indication of the reputation of our protection system, it is interesting to note that western Oregon and western Washington have been selected as the first field in which to offer insurance upon standing timber.

No article on forest fire work in Oregon would be complete without a testimonial to the thorough and novel work done in enlisting public sentiment by Mr. E. T. Allen of the Western Forestry and Conservation Association. Nor must we forget the splendid coöperation and helpful hints of the Federal Forest Service.

The Oregon Forest Fire Association has only had one manager, Mr. C. S. Chapman, formerly a U. S. District Forester. To his ability, patience and enthusiasm we are chiefly indebted for wise legislation and the splendid spirit of coöperation which now exists among Oregon timber owners.

LUMBER AND ITS USES

THE College of Agriculture of the University of California announces a correspondence study course on "Lumber and Its Uses," to be given under the direction of the Division of Agricultural Education. This course, which is prepared by Prof. M. B. Pratt of the Division of Forestry, is planned to be of value to all persons having to do with lumber. It deals particularly with lumber produced on the Pacific coast, the general nature of the assignments being as follows: The Structure of Wood; Physical Properties of Wood; Mechanical Properties of Wood; Standard Grades and Sizes; Structural Timbers; Seasoning of Timber; Wood Preservation; The Finishing and Fireproofing of Wood; Lumber Prices and Cost of Construction; Specific Uses and Qualities of Western Woods.

Canadian Department

By Ellwood Wilson

Secretary, Canadian Society of Forest Engineers

The Canada Paper Company, Ltd., under the able management of Mr. F. J. Campbell, has just paid up $28.00 per share of deferred dividends on its preferred stock. This company commenced some forestry work last year and this year cut fire lines and began the cleaning up of woodlands. The companies who use the most advanced forestry methods are the most successful financially.

Capt. J. H. A. Acer, Sales Manager of the Laurentide Company, Ltd., has been recruiting a machine-gun battery in Grandmère, and has taken fifteen Company men and has gotten in all, from the St. Maurice Valley, about thirty-five recruits. James S. Scott, a former employee and son of Col. Scott, of Quebec, has received the Military Cross for aviation work. Mr. Stuart, formerly with the Forestry Division, has been promoted for bravery.

The plant of the Abitibbi Company, at Iroquois Falls, Ontario, was, fortunately, not damaged by the recent forest fires.

Mr. T. W. Dwight, of the Dominion Forest Branch, spent two days at Grandmère, looking over the plantations, nurseries, etc., of the Laurentide Company, Ltd.

The fire situation in British Columbia has been dangerous and all permits to burn slash have been cancelled until the danger season is past. Eight settlers have been burned out, but the Fire Protection Service has the matter in hand.

The Riordan Paper Company, of Montreal, have begun, at the advice of their Forester, Mr. Volkmar, and after an investigation of the planting operations of the Laurentide Company, planting operations on their limits. This Company has been financially successful and is up-to-date in every respect.

Mr. A. H. Unwin, a member of the Canadian Society of Forest Engineers, who is at present stationed in Nigeria in Africa, has a very interesting article in the July number of the *Canadian Forestry Journal* on conditions in that country.

The Canadian Pacific Railway is again to the front with a most important project, the establishment of the Canadian Research Bureau, under the direction of the well-known chemical engineer of Boston and a former president of the American Chemical Society. The object of the Bureau is to investigate, organize and systematize our natural resources, minerals, metals, hydro-electric possibilities and forests and to formulate plans for the lessening of waste. The bulletins issued will be sent out to manufacturers, merchants and others interested.

The distances covered by experienced forest rangers are seldom realized. During thirty-nine days the sixty rangers employed by the Lower Ottawa Forest Protective Association covered 21,678 miles of trails and highways, making an average of about ten miles a day, which, considering the country, is pretty good going. The telephone has been of the greatest value in the work of this Association. The W. C. Edwards and Gilmour and Hughson Companies have built quite a number of miles of lines, and the Association is negotiating to take over and operate these.

Mr. Herman Schanche, who has been for the past year with the Laurentide Company's Forestry Division, is returning to Penn State College to continue his forestry studies, as is also Mr. Charles Claxton, who has been in charge of fire ranging on the Company's planted lands.

Mr. Arnold Hanssen, of the same Company, and a member of the Canadian Society of Forest Engineers, who has done splendid work in the establishment and development of the Laurentide's nurseries, is going to take the forestry course at Yale this winter. Mr. Hanssen graduated at the University of Konigsberg in Norway and has worked at Grandmère ever since coming to Canada.

Recruiting for the 242nd Forestry Battalion, C. E. F., under Lt.-Col. J. B. White, of the Riordan Paper Company, of Montreal, has begun and the Battalion hopes to get to strength and go over to England before November. This will be a most excellent opportunity for foresters or forestry students to see and work in the forests of England and France, to get a good military training, and to help the Allies in their fight for the world's liberty. Men of American residence can probably enlist and will meet a fine body of men. The editor of this Department will gladly receive inquiries.

Lieut. J. G. Sheare, 1st Regiment, Grenadier Guards, president of James Shearer Company, Ltd., dealers in sash and doors, of Montreal, was recently presented with a testimonial from the Royal Humane Society for his gallant service in stopping a runaway horse.

It Was Asheville, N. C.

In the article, "County, City, Town, and School Forests," by J. W. Toumey, director of the Yale Forest School, in American Forestry for July, Asheville, N. C., was inadvertently placed under the state heading, New Jersey.

A Firm's Changes

The firm of Thomas Meehan & Sons, of Dresher, Pennsylvania, was dissolved recently and announcement made that the retail department and nursery at Germantown, Philadelphia, and the landscape department at Mt. Airy, Philadelphia, will be continued by S. Mendelson Meehan and J. Franklin Meehan, under the firm name of Thomas Meehan & Sons, while the wholesale department and nursery at Dresher, Pennsylvania, will be taken over by Thomas B. Meehan and his son, Albert F. Meehan, and will be conducted under the firm name of Thomas B. Meehan Company.

Blowing Up a Tree

R. F. Vann, of Columbia, South Carolina, writes: "Some time ago a neighbor had a fine large hickory tree blown down during a storm. After obstructing a roadway for some time, he decided to cut it up. It had then become dry and, being knotty, was extremely tough. When he tried to saw it, the timber closed on the saw. Then we bored holes in the top and sides of the log, loaded them with dynamite and tamped with a stiff yellow clay. In priming we used electric fuses and fired the shots all at the same time. It took just about an hour to dispose of this tree which had been an eye-sore for several months."

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MISSOULA, MONTANA

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OFFERS specialized graduate training leading to the degree of Master of Forestry in the following fields:—Silviculture and Management, Wood Technology, Forest Entomology, Dendrology, and (in cooperation with the Graduate School of Business Administration) the Lumber Business

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Wood "Where Best"

"*TIM-BER*"

says:

"Wood is the most universal, most adaptable building material in the world.

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"Wood is the lightest building material known, and the strongest, weight for weight.

"Its qualities are known; it is easy to work; it can be cut and shaped by anyone into the myriad uses required for the shelter and comfort of man.

"There is no other material as beautiful in appearance, more susceptible to artistic finish, nor which is as productive of sentiment and satisfaction for home building.

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SERVICE DEPARTMENTS

The Trade Extension Department of the National Lumber Manufacturers Association offers a unique free service to Architects, Engineers, Retailers and Builders. The Blue Book of the National Lumber Manufacturers Association gives prompt and reliable credit rating and collection service. The Inter-Insurance Exchange of the National Lumber Manufacturers Association furnishes sound indemnity for losses by fire in saw-mills, planing mills and lumber yards.

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Declaration of Principles and Policy of The American Forestry Association

IT IS A VOLUNTARY organization for the inculcation and spread of a forest policy on a scale adequate for our economic needs, and any person is eligible for membership.

IT IS INDEPENDENT, has no official connection with any Federal or State department or policy, and is devoted to a public service conducive to national prosperity.

IT ASSERTS THAT forestry means the propagation and care of forests for the production of timber as a crop; protection of watersheds; utilization of non-agricultural soil; use of forests for public recreation.

IT DECLARES THAT FORESTRY is of immense importance to the people; that the census of 1913 shows our forests annually supply over one and a quarter billion dollars' worth of products; employ 735,000 people; pay $367,000,000 in wages; cover 550,000,000 acres unsuited for agriculture; regulate the distribution of water; prevent erosion of lands; and are essential to the beauty of the country and the health of the nation.

IT RECOGNIZES THAT forestry is an industry limited by economic conditions; that private owners should be aided and encouraged by investigations, demonstrations, and educational work, since they cannot be expected to practice forestry at a financial loss; that Federal and State governments should undertake scientific forestry upon national and State forest reserves for the benefit of the public.

IT WILL DEVOTE its influence and educational facilities to the development of public thought and knowledge along these practical lines.

It Will Support These Policies

National and State Forests under Federal and State Ownership, administration and management respectively; adequate appropriations for their care and management; Federal coöperation with the States, especially in forest fire protection.

State Activity by acquirement of forest lands; organization for fire protection; encouragement of forest planting by communal and private owners, non-political departmentally independent forest organization, with liberal appropriations for these purposes.

Forest Fire Protection by Federal, State and fire protective agencies, and its encouragement and extension, individually and by coöperation; without adequate fire protection all other measures for forest crop production will fail.

Forest Planting by Federal and State governments and long-lived corporations and acquirement of waste lands for this purpose; and also planting by private owners, where profitable, and encouragement of natural regeneration.

Forest Taxation Reforms removing unjust burdens from owners of growing timber.

Closer Utilization in logging and manufacturing without loss to owners; aid the lumbermen in achieving this.

Cutting of Mature Timber where and as the domestic market demands it, except on areas maintained for park or scenic purposes, and compensation of forest owners for loss suffered through protection of watersheds, or on behalf of any public interest.

Equal Protection to the lumber industry and to public interests in legislation affecting private timberland operations, recognizing that lumbering is as legitimate and necessary as the forests themselves.

Classification by experts of lands best suited for farming and those best suited for forestry; and liberal national and State appropriations for this work.